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HARVARD SCHOOL OF PUBLIC HEALTH



Courses of Instruction

1965-1966

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THE HARVARD SCHOOL OF PUBLIC HEALTH

1965 - 66



*55 Shattuck Street
Boston, Massachusetts*

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Rotch Building

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Section I

Introductory Information

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Office, Peter Bent Brigham Hospital, 721 Huntington Avenue,
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The Offices of Administration of the School of Public Health are
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JAMES JOSEPH FEENEY, A.B., M.D., *Director, Medical Area Health Service.*

MARGARET GUSS BARNABY, A.B., *Administrative Assistant to the Dean* (Honorary member).

ROGER BENHAM SPAULDING, A.B., *Assistant to the Dean.*

The names of the members of the teaching and research staff are listed in their respective departments under Content of the Courses, pages 37-90.

INTRODUCTION

The Harvard School of Public Health is one of the six privately endowed institutions in the United States which are primarily devoted to graduate education in public health. The School operates as an independent unit of Harvard University in close association with the Faculty of Arts and Sciences; the Graduate Schools of Education, Public Administration and Business Administration; the Medical School; the School of Dental Medicine; and the various Harvard hospitals. This introduction indicates in a general way the opportunities the School affords those students who are seeking a career in one or more of the three principal areas of public health activities: teaching, research, and administration.

Public health evolved from the early combination of medical science and engineering for the control of environmental hazards. Public health has grown to embrace various facets of the biological, physical and social sciences as the community aspects of health problems have become more complex. In its plans for the future, the Harvard School of Public Health is principally concerned with two general kinds of problems. In the first category are the problems which have emerged as certain areas of the world have become highly urbanized and technologically advanced. Foremost among these problems are mental illness, cancer and the degenerative diseases, accidents, and the hazards of ionizing radiations. Discovery of causes and factors which modify the course of illness and injury is necessary for the development of prevention and control. Research is also needed to achieve effective administrative technics for the provision of optimum health services for entire communities.

The other general category of problems in public health derives from the fact that more than half of the people in the world reside in areas seriously afflicted by malnutrition and communicable diseases. The programs which have been successful in the technologically advanced countries often cannot be used because of basic differences in culture, geography or economic factors.

In its approach to these problems the Harvard School of Public Health has as its objective the advancement of public health, both

SCHOOL OF PUBLIC HEALTH

nationally and internationally. The School seeks to accomplish its objective through its activities in education and by its search for knowledge. The Faculty is equally committed to basic research in new fields and to the development of effective methods for the application of knowledge by communities or nations. The Faculty of the School and its alumni have the opportunity to play a role of major importance in the decades ahead as the profession of public health deals with the health problems of our rapidly changing societies.

The primary intent of the curriculum in the Harvard School of Public Health is to attract individuals who have the potentiality for original contributions to public health. In the selection of applicants preference will be given by the Admissions Committee to students who are capable of undertaking a course of study leading to a doctoral degree in one of the departments or disciplines of the School.

FACILITIES

Most departments of the School of Public Health are housed in four buildings: the Rotch Building at 55 Shattuck Street, the Huntington Building at 1 Shattuck Street, and two research buildings at 665 Huntington Avenue, Boston 02115. The administrative offices are in the Rotch Building. The School's buildings are adjacent to the Harvard Medical and Dental Schools, the Children's Medical Center, the Peter Bent Brigham Hospital, and the Boston Lying-In Hospital.

The facilities of the hospitals and the adjacent institutions are available to qualified students of this School, and are used in connection with the teaching of various subjects. In addition, students enrolled at the School may take courses in other departments of Harvard University, such as in the social sciences, public administration, and medical sciences. Certain graduate courses at the Massachusetts Institute of Technology are also open to students of this School.

The Department of Sanitary Engineering of the School is also part of the Division of Engineering and Applied Physics of the Harvard Graduate School of Arts and Sciences. The basic course in environmental sanitation for students of the School of Public

HARVARD UNIVERSITY

Health is taught here, but properly qualified students may also register for courses in Sanitary Engineering given in Cambridge.

The School maintains a close association with a wide variety of health, medical care, and welfare organizations in Massachusetts and elsewhere. These include health departments, hospital and other medical facilities, private health and welfare agencies, and community planning groups. These organizations provide opportunities for observation and special studies, and members of their staffs are available to assist in the School's educational program. Administrative methods at local levels may be studied at first hand in some of these agencies in the Greater Boston Area.

The Institute of Laboratories of the Massachusetts Department of Public Health is engaged in a program of general interest, attracting visitors and students from various parts of the United States and from foreign countries. It not only performs a wide variety of standard bacteriological, immunological and chemical procedures, but is actively engaged in several research programs. Its Superintendent is a member of the School's Faculty. This close contact with one of the country's outstanding laboratories provides unsurpassed opportunities for qualified students who wish to obtain intensive experience in many types of laboratory methods of particular pertinence to public health.

The clinical and laboratory facilities of the Lemuel Shattuck Hospital are available to students of the School. This hospital was built by the Department of Public Health of the Commonwealth of Massachusetts for the treatment and rehabilitation of patients with chronic diseases. Since the average duration of hospitalization is usually longer than that in general hospitals, an opportunity is afforded to study chronic disease problems not encountered in general hospitals. The training program, consultant rounds and professional staff appointments are under the aegis of the Deans of Boston University, Harvard and Tufts University Medical Schools, as well as the Harvard School of Public Health. Research laboratories at the Shattuck Hospital are engaged in studies of arthritis, hematology, pulmonary function, radioisotopes, cancer therapy and chronic renal and hepatic diseases.

SCHOOL OF PUBLIC HEALTH

LIBRARIES

The library needs of the School of Public Health are served principally by the Francis A. Countway Library of Medicine, which opened its doors to readers in June 1965. The Countway Library, located at 10 Shattuck Street, combines the resources and services of the Harvard Medical Library and the Boston Medical Library. Among libraries serving medical and health-related schools, it is the largest in the country. Its recorded holdings number 390,000 volumes, and it receives 3,900 periodicals. The Countway Library is open:

8:00 a.m. to 11:30 p.m. weekdays

9:00 a.m. to 5:00 p.m. Saturdays

2:00 p.m. to 6:00 p.m. Sundays

In addition to its holdings of current books and periodicals, the Countway Library has extensive collections of historical materials, dating from the 15th Century. Its History of Medicine Department provides modern facilities for the use of these books and other rarities.

For the convenience of the several departments of the School, collections of books and journals are maintained within those departments.

All members of the University may borrow from the College Library at Cambridge. Messenger service is provided daily between the College Library, various other University Libraries and the Countway Library.

The Boston Public Library issues cards to permanent and to temporary residents of Boston. Others may obtain cards upon payment of a small fee. Other libraries of the Boston area, notably those of the Massachusetts Institute of Technology, add to the total book and periodical resources available to students.

The librarian of the Countway Library is Ralph T. Esterquest, and Dr. Jean Mayer represents the School of Public Health on the Library Committee.

EXTRACURRICULAR EVENTS

A significant part of the opportunity for the exchange of knowledge in the health fields is the extracurricular activity which takes

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place under student or faculty sponsorship. Throughout the year there are informal interchanges of ideas among members of the student body and their families, particularly in the social and recreational areas of the Henry Lee Shattuck International House. In addition there are discussions on topics of international interest including presentations by students on the culture, geography, and social structure of their home countries. The Henry Lee Shattuck International House has equipment for showing films and colored slides which facilitates the scheduling of such occasions.

Section II

Admission Requirements
Courses of Study and Degrees

ADMISSION REQUIREMENTS

APPLICATION FOR ADMISSION

Applicants for admission to the School must submit the following material for consideration by the Committee on Admissions and Degrees: (1) completed application form; (2) transcripts of academic record at college, graduate school and/or professional school; (3) names of at least three people, well acquainted with the applicant's previous work, from whom the School may request letters of reference.

Applicants from countries in which the language of instruction is not English must satisfy the Committee on Admissions and Degrees as to their ability to speak, read, write and understand the English language competently. In order to profit from a program of graduate study, the applicant must have sufficient knowledge of English to enable him to understand lectures in English, to participate in seminar discussions and to write examinations. In the absence of sufficient evidence from the sponsoring agency and other sources, the School may request that the applicant take and pass satisfactorily the University of Michigan English Language Test. If, upon arrival at the School, a student's command of English is found to be inadequate, he may be required to take further instruction in English.

In addition to fulfilling the specific requirements for admission to the several degree programs, applicants must satisfy the Committee as to their scholastic ability and potentiality for profitable study at a graduate level. In all instances, the final judgment as to the admissibility of an applicant rests with the Committee on Admissions and Degrees.

Preference will be given to applicants under 40 years of age; applicants over 45 years of age may be considered for admission only under exceptional circumstances.

The School is unable to accept all who apply and are eligible for admission. Therefore, persons who wish to be considered for ad-

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mission to the 1966-67 Class are urged to submit their applications by April 1, 1966. However, applications which are completed *by July 31, 1966*, will be considered, subject to availability of space.

Admission of a candidate for one academic year does not automatically admit him in a subsequent year; re-application must be considered on the candidate's own merits in the light of the particular circumstances which govern the decisions of the Committee on Admissions and Degrees.

All inquiries and communications regarding admission should be addressed to The Registrar, Harvard School of Public Health, 55 Shattuck Street, Boston, Massachusetts, 02115.

LIVING EXPENSES

Experience has shown that it is difficult for a student to get the most out of his year at the School if he has to be unduly concerned about funds to meet his expenses. Living costs in the Boston area are usually found to be higher than in most areas from which students come. Therefore, the School has adopted the policy stated below in regard to applicants for admission from outside the United States.

An applicant whose financial support is not guaranteed by an official U. S. agency or foundation must submit evidence satisfactory to the School that he will have sufficient funds available in U. S. currency to enable him to pay his expenses during the academic year. The minimum amount needed by a single person, in addition to travel, is \$3,800, to cover the cost of tuition (\$1,520) and living expenses of at least \$250 a month for nine months. If an applicant plans to bring his family, he must have at least \$900 more for his wife and \$450 for each dependent child, in addition to travel expense. Certification of adequate financial resources must be received by the School before the immigration form needed to obtain a visa to enter the U.S. can be issued to the student.

SCHOOL OF PUBLIC HEALTH

COURSES OF STUDY AND DEGREES

MASTER OF PUBLIC HEALTH DEGREE

Requirements for Admission

1. Applicants may be considered for admission as candidates for the Master of Public Health degree if they are graduates of approved schools of medicine or if they have similarly thorough preparation in the biological sciences.

2. Persons with these qualifications must satisfy the Committee on Admissions and Degrees as to their scholastic abilities and potentiality for profitable study at a graduate level. In arriving at its decision, the Committee will give consideration to practical experience when relevant.

Requirements for the Degree

1. One academic year must be spent in residence at the University. The student must complete successfully the required and elective courses to a minimum total of 40 credit units. The basic curriculum for the Master of Public Health degree includes courses in ten areas. All candidates for the degree are required to take the following four courses, unless they can demonstrate equivalent preparation:

<i>Course</i>	<i>Credit units</i>
Biostatistics 1a,b	3.5
Epidemiology 1a,b	2.5
Public Health Practice 1a,b	3
Environmental Health 1d	2.5

2. In addition they must elect a minimum of 12.5 credit units in the remaining six courses of the basic curriculum, as follows:

	<i>Credit units</i>
Ecology and Epidemiology of Infectious Diseases (Microbiology and Tropical Public Health 1a,b,c)	6
Epidemiology of Non-Infectious Disease (Epidemiology 2c,d)	3
Man's Responses to the Physical Environment (Environmental Health 1b)	2.5

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The Human Community (Interdepartmental Course 1a)	2.5
Principles of Maternal and Child Health (Maternal and Child Health 1c)	2
Public Health Nutrition (Nutrition 1a,b)	2.5

3. The remainder of the time will be devoted to departmental or divisional courses, seminars and tutorial work. These courses are described on pages 37–90. Courses offered by other Faculties of the University are also available.

4. No formal classes are scheduled during the one-week period from January 31 to February 5, 1966. This time is to be used for supervised special studies or field observations. All candidates for the Master of Public Health degree are required to register for work during this week, under Course 17e (Tutorial) or Course 30e (Field Study). See listings under the Departments for opportunities available. One unit of credit will be given for satisfactory completion of the week's assignment.

MASTER OF SCIENCE IN HYGIENE DEGREE (With Designation of a Field of Concentration)

This degree is granted on fulfillment of a program of advanced work in one of the basic disciplines of public health. The courses taken must form an integrated plan of study in one branch of knowledge and allied subjects.

Requirements for Admission

Applicants may be considered for admission as candidates for the Master of Science in Hygiene degree, on the basis of a one-year or a two-year program, if they meet the requirements in one of the categories listed below. They must also satisfy the Committee on Admissions and Degrees and the department within which they choose to specialize as to their potentiality for successful study at a graduate level within the School.

A. One-year Program

1. Applicants who are graduates of approved schools of medicine

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or who have similarly thorough preparation in the biological sciences.

2. Applicants who have a doctoral degree from an approved school in a discipline related to public health.

3. Applicants in public health specialties (social workers, nurses, health educators, nutritionists) who have obtained a master's degree with honor grades in their special fields and have had at least two years' acceptable experience in a public health activity.

4. Applicants in industrial hygiene or public health engineering who have a bachelor's degree with honor grades in physics, chemistry and engineering and who have a master's degree or equivalent graduate work with honor grades.

B. Two-year Program

1. Applicants with a bachelor's degree obtained with honors in the natural sciences who wish to specialize in one of the laboratory sciences or statistics.

2. Applicants with a bachelor's degree obtained with honors and with an adequate background in the natural sciences who wish to specialize in health education.

Under certain circumstances, a year of graduate work in another institution may be accepted as the first year of this program.

Requirements for the Degree

1. The student must spend a minimum of one year in residence at the University and must complete successfully a program of at least 40 credit units. Candidates in the two-year program must obtain at least 80 credit units.

2. All candidates for the degree are required to take Biostatistics 1a,b and Epidemiology 1a,b, unless they can demonstrate equivalent preparation. Candidates who do not have a doctoral degree will also be required to take Interdepartmental Course 2a,b (see page 39). The remainder of the program will be devoted to courses which may be prescribed by the department of concentration and to elective courses in the primary and related fields of interest. These courses are described on pages 37-90. Courses offered by other Faculties of the University are also available.

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3. No formal classes are scheduled during the one-week period from January 31 to February 5, 1966. This time is to be used for supervised special studies or field observations. All candidates for the Master of Science in Hygiene degree are required to register for work during this week, under Course 17e (Tutorial) or Course 30e (Field Study). See listings under the Departments for opportunities available. One unit of credit will be given for satisfactory completion of the week's assignment.

MASTER OF INDUSTRIAL HEALTH

A program of courses leading to a Master of Industrial Health degree was established in 1949, in recognition of the need for post-graduate training in the public health disciplines which are relevant to the development of health and medical programs in industry.

Requirements for Admission

Candidates for this degree must be graduates of an acceptable school of medicine and must also satisfy the Committee on Admissions and Degrees as to their scholastic abilities and potentiality for profitable study at a graduate level. Students from the United States must have completed an internship of at least twelve months in a hospital approved by the American Medical Association.

Requirements for the Degree

1. One academic year must be spent in residence at the University.
2. The student must complete successfully the required and elective courses to a minimum total of 40 credit units. All candidates for the degree are expected to take the following courses unless they can demonstrate equivalent preparation:

<i>Course</i>	<i>Credit units</i>
Biostatistics 1a,b	3.5
Epidemiology 1a,b	2.5
Environmental Health 1d	2.5
Environmental Health 2a,b (Radiological Hygiene)	4
Environmental Health 7d (Occupational Medicine)	2

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Industrial Hygiene 1c,d (Basic Problems in Occupational Health and Industrial Environments)	7
Industrial Hygiene 2a,b (Industrial Air Analysis)	4
	<hr/>
Total	25.5

In addition, the student may select from the general curriculum courses of interest to him, or do special work subject to approval of the Heads of the Departments of Industrial Hygiene or Physiology.

3. No formal classes are scheduled during the one-week period from January 31 to February 5, 1966. This time is to be used for supervised special studies or field observations. All candidates for the Master of Industrial Health degree are required to register for work during this week, under Course 17e (Tutorial) or Course 30e (Field Study). See listings under the Departments for opportunities available. One unit of credit will be given for satisfactory completion of the week's assignment.

DOCTOR OF PUBLIC HEALTH

For the degree of Doctor of Public Health the student must complete an approved program of independent and original investigation in a special field and must present the results of this research in an acceptable thesis.

Requirements for Admission

1. An applicant for admission to candidacy for this degree must be either (a) a graduate of an approved school of medicine, dental medicine or veterinary medicine, or (b) the holder of another doctoral degree in one of the basic sciences related to public health. In exceptional cases, an individual lacking a previous doctoral degree may be admitted if he has displayed outstanding ability in previous academic work and in practical public health experience.

2. The applicant must hold the degree of Master of Public Health or its equivalent from a recognized institution and must have demonstrated potential ability to undertake original investigation in a special field.

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3. Admission to doctoral candidacy is considered provisional until the candidate has passed the oral qualifying examination.

DOCTOR OF SCIENCE IN HYGIENE (With Designation of a Field of Concentration)

This degree is granted on successful completion of a program of independent and original research in one of the basic disciplines of public health, and the presentation of this research in an acceptable thesis.

Requirements for Admission

Candidates for the degree of Doctor of Science in Hygiene must hold the degree of Master of Science in Hygiene or its equivalent and must indicate ability to undertake original investigation in a special field.

Admission to doctoral candidacy is considered provisional until the candidate has passed the oral qualifying examination.

REQUIREMENTS FOR DOCTORAL DEGREES

1. Residence

The student is required to complete a minimum of one academic year in residence. However, the required work and preparation of an acceptable thesis normally requires two full years and frequently longer.

2. Doctoral Program Advisor

After the student enrolls in the School as a provisional doctoral candidate, a Doctoral Program Advisor is appointed by the Department of concentration. This Advisor will keep the student informed of all procedures and requirements for the degree, will advise him about proper courses to be taken, will decide, together with the Department, when the student is prepared to take the qualifying examination, and will supervise the thesis work.

3. Foreign Language Requirement

The candidate must possess a reading knowledge of two languages, other than English, which will enable him to make use of the foreign literature pertinent to his professional interests, including his thesis subject. One of the languages must be French, German or Russian; the second may be another of these three languages or an additional one selected with the consent of the Department of concentration and the Committee on Admissions and Degrees. For a foreign student one of the languages may be his native tongue, subject to the approval of the Committee on Admissions and Degrees. One language examination must be passed before the candidate is permitted to take the qualifying examination. The second language examination must be passed before the appointment of the Readers of the Thesis. The candidate is urged to satisfy the language requirements as early as possible.

4. Qualifying Examination

When the Advisor and the Department judge that the candidate is prepared, an oral qualifying examination is conducted by Special Examiners, who examine in depth in the area of the candidate's general academic knowledge, his major interest, and related fields. This examination should be taken within six months, but no later than one year, after admission as a provisional doctoral candidate.

5. Evaluation of Candidate's Progress

After the candidate has passed the qualifying examination, two Faculty members are appointed to aid the Advisor in the periodic evaluation of the student's progress.

6. Deadline Dates for Thesis

After the Advisor and Department deem the thesis completed, it shall be typed in final form. Three unbound copies must be deposited in the Dean's Office *before January first*, for degrees to be awarded at midyear, and *before April fifteenth* for degrees to be awarded in June. The thesis must be accompanied by 100 copies of a summary

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not exceeding 1200 words in length, which shall indicate clearly the purpose, methods, and results of the investigation.

7. Acceptance of the Thesis and Final Examination

When the thesis is submitted, three Readers will be appointed to determine if it is acceptable. If it is approved, a final examination will be given at which the student will defend his thesis before members of the Faculty, including the Readers. Ordinarily, the thesis must be approved within five years of the date of the qualifying examination.

A detailed statement of procedures and requirements for the doctoral program and for the preparation of the thesis may be obtained from the Registrar after the student has been admitted to provisional candidacy for the degree.

SPECIAL STUDENTS

Subject to availability of space, the School may accept a few students, on a full-time or a part-time basis, who are not degree candidates, but who are interested in taking one or more courses in a special field. Procedures and requirements for the admission of such students are the same as for degree candidates. Special students who later wish to be admitted to degree candidacy will be considered on the same basis as other applicants for admission. Admission as a special student carries with it no commitment to accept the applicant as a degree candidate.

DEGREES IN ENGINEERING

Graduates of engineering colleges or scientific schools of recognized standing who are interested in the environmental engineering aspects of public health may be admitted to the Division of Engineering and Applied Physics of the Graduate School of Arts and Sciences as candidates for the degree of Master of Science, Master of Arts, Master of Engineering or Doctor of Philosophy. They may elect appropriate courses in the School of Public Health as a part of the program for these degrees.

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For further information write to the Committee on Admissions, Graduate School of Arts and Sciences, Holyoke Center, 75 Mt. Auburn Street, Cambridge, Massachusetts, 02138.

GRADING SYSTEM

The grading system in effect at the School of Public Health is as follows: A and B are honor grades; C is acceptable; D is acceptable but of inferior quality; F is failing. Grade averages are computed on the basis of numerical equivalents, and according to the number of credit units in each course: A-1, B-2, C-3, D-5, F-8. The minimum level of performance acceptable for a Master of Public Health degree is C-(3.5) average. The minimum level of performance acceptable for a Master of Industrial Health or Master of Science in Hygiene is C (3.0) average. All graded courses are included in the average. The minimum level of performance acceptable for admission to doctoral degree candidacy is 2.5, based on at least one term's work.

A student cannot qualify for a degree if he fails one or more required courses. However, if he fails only one required course, he may request a re-examination in that course. Re-examination will be given subject to approval of the instructor in the course and of the Committee on Admissions and Degrees, and will normally be given only after a period of additional study or course work, within a period of eight weeks following the initial failure.

A grade recorded as "Incomplete" will be changed to "F" if the course requirements are not satisfactorily fulfilled by the end of the next period or before the end of the academic year, whichever comes first.

Section III
Content of Courses

CONTENT OF COURSES

INTERDEPARTMENTAL COURSES

Interdepartmental Course 1a. The Human Community

Lectures and seminars. *Mondays and Fridays, 8:30-10:30, Wednesdays, 8:30-9:30, first period.* Dr. LEVINE, Dr. CROOG and Dr. SCOTCH.

Credit 2.5 units.

One of the six semi-elective courses from which Master of Public Health candidates are required to elect a minimum of 12.5 credit units.

Comprehension of health problems and implementation of health programs depend upon understanding the forms and forces active in community life. This course of instruction deals with demography, social and cultural characteristics of human populations, the organization and behavior of human communities, and their relationship to the environment. The objective of the course is to provide a knowledge of, and a set of concepts dealing with, human populations, interpersonal relationships, cultural values, and social organization, in preparation for the study of public health.

Interdepartmental Course 2a,b. Biostatistics and Epidemiology

Lectures and discussions. *Wednesdays, 4:30-5:30, first and second periods.* Dr. WORCESTER, Dr. BELL and Dr. HUTCHISON.

Credit 1 unit.

Biostatistics and Epidemiology are required of Master of Science in Hygiene candidates. In 1965-66, this requirement will be met by enrollment in Biostatistics 1a,b (3.5 units), Epidemiology 1a,b (2.5 units) and, for those candidates without a doctoral degree, Interdepartmental Course 2a,b (1 unit), which meets one hour each week in the fall term. This additional session will provide supplementary information and an opportunity to discuss the material presented in the Departmental courses.

Interdepartmental Course 4c,d. Research Methods in Community Health

Lectures and discussions. *Tuesdays and Thursdays, 8:30-10:30, third and fourth periods.* Dr. LEVINE, Dr. FELDMAN and associates.

Credit 4 units.

This elective course, offered by members of the Biostatistics and Public Health Practice Departments, is intended primarily for doctoral candidates and other advanced students who require specialized preparation to conduct or administer scientific research on social and community aspects of health, health behavior and health organization. The merits of alternative research de-

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signs will be covered by means of lectures, discussions of current research projects, and presentations of students' own research plans. Instruction will cover a range of methods and techniques including survey methods, case and longitudinal studies, as well as relevant statistical techniques, methods of constructing and administering interviews, and other methods of data collection and analysis. Admission is limited and requires the consent of the instructors.

Interdepartmental Course 3b. History and Philosophy of Public Health

Seminars. *Wednesdays, 3:30-5:30, second period.* Dr. MAYER and Visiting Lecturers.

Credit 1 unit.

The course has two major purposes: to help the student of Public Health gain a picture of the development of his profession, and to use selected historical situations to illustrate how scientific knowledge has interacted in the past with political structure, economic status and cultural attitudes in the determination of the health goals of various societies and the execution of programs. In this light, the development of the science and practice of medicine, sanitary engineering and demography in Ancient Egypt, Greece and Alexandria, Rome, the Arab and European Middle Ages and the Renaissance will be broadly sketched. The birth of the concept of a National Health Policy will be traced to the Ages of Mercantilism and Enlightenment. The Sanitary Movement and its relation to the Industrial Revolution will be examined with particular reference to Britain, France and the United States. Finally, an attempt will be made to evaluate the extent to which the lessons of history can be used in the formulation of health policies in a changing world, both in industrial and in developing nations.

Interdepartmental Course 42a,b,c,d. Seminar on Teaching of Preventive Medicine and Public Health

Seminars. Time to be arranged in all four periods. Dr. SEGALL and Dr. LEY.

Credit 4 units.

The seminars are designed for students who are preparing for careers as teachers of preventive medicine and public health. Components of the preventive medicine curriculum are considered with respect to course organization and instruction. Current aspects of educational theory relevant to the teaching of medical students are discussed by visiting specialists. Opportunity for field observation of teaching within selected departments of preventive medicine is provided.

Interdepartmental Course 43d. Community Psychiatry and Mental Health

Seminars. *Wednesdays, 3:30-5:30, fourth period.* Dr. FARNSWORTH, Dr. BALER and guest speakers.

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Credit 1 unit.

This series of eight seminars will deal with the development during the last decade of community psychiatry and mental health with particular reference to the interests of public health workers. Representative leaders from the national and local scene will participate in presenting a composite view of the present programs and problems.

DIVISION OF ENVIRONMENTAL HEALTH SCIENCES AND ENGINEERING

JAMES L. WHITTENBERGER, S.B., M.D., A.M. (hon.), *Head of the Division*

The Division includes the Departments of Industrial Hygiene, Physiology and Sanitary Engineering. The names and titles of the Faculty and Staff members of the Division, and the courses available, are listed in the respective departments.

Candidates for the Master of Public Health degree who elect to concentrate in the field of Environmental Health are normally expected to take the following courses in addition to satisfying the formal course requirements for the degree:

Occupational Medicine and Aviation Medicine

Biostatistics 2c,d
Industrial Hygiene 1c,d
Public Health Practice 6d
Environmental Health 3a,b
Environmental Health 4c,d

Radiological Health and Toxicology

Biostatistics 2c,d
Industrial Hygiene 1c,d

Other courses will be selected in the area of the student's interest after conference with his advisor.

DIVISIONAL COURSES

Environmental Health 1b. Man's Responses to the Physical Environment

Lectures, demonstrations and field trips. *Mondays and Fridays, 8:30-10:30, Tuesdays, 11:30-12:30, Wednesdays, 8:30-9:30, second period.* Dr. FERRIS and associates.

Credit 2.5 units.

One of the six semi-elective courses from which Master of Public Health candidates are required to elect a minimum of 12.5 credit units.

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Physiologic responses evoked by the physical and chemical attributes of man's environment will be described and the limits of such responses emphasized. Methods for assessing and controlling environmental stresses will be presented. Topics covered will include: temperature, humidity, barometric pressure, ionizing radiation, air pollution, toxicology, illumination, and noise.

This course is intended for Master of Public Health candidates who are not specializing in Industrial Hygiene or Occupational Medicine. It is also open to other students who have had Physiology 1a,b or its equivalent and who have had chemistry and physics at a college level.

Environmental Health 1d. Principles of Water and Food Sanitation

Lectures and demonstrations. *Tuesdays and Thursdays, 10:30-12:30, Saturdays, 9:30-11:30, fourth period.* Professors THOMAS, MORRIS and STUMM. The hour from 11:30-12:30 on Thursdays is a discussion period. It is optional and carries no credit.

Credit 2.5 units.

Required of Master of Public Health and Master of Industrial Health candidates. Candidates for the degree of Master of Science in Hygiene may also elect this course.

This course emphasizes some of the broad engineering principles useful in the control of man's environment. These principles are presented in a manner appropriate to students who have no engineering background. Technics of control are discussed, but are presented as illustrations of principle, not as rule-of-thumb procedures that the student is expected to learn by rote.

The objective of the course is not the conversion of the student into an engineer, ready to design water works, or develop milk-pasteurizing plants, but rather to prepare him to advise, to cooperate with, and to understand the people who are to do the job. It also acquaints him with the nature and extent of the sanitary problem, with what can be and has been accomplished by water and food sanitation, and with what may be expected to be done in the future.

The topics considered include: water supply and purification; the sanitation of swimming pools and bathing beaches; sewerage and sewage treatment; refuse and nightsoil collection and disposal; and food, milk and shellfish sanitation.

Environmental Health 2a,b. Radiological Hygiene

Lectures, laboratories and field trips. *Mondays, 1:30-4:30, Wednesdays, 3:30-4:30, first and second periods.* Dr. SHAPIRO and Staff of the Division.

Credit 4 units.

This course will present the essentials of atomic and radiation physics as an introduction to the evaluation of health hazards from ionizing radiation. Students with adequate background in physics and mathematics may be

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excused from the lecture portion of the course. Credit for the laboratory alone is 1.5 units.

Environmental Health 2c,d. Problems in Radiation Dosimetry

Lectures. Two hours a week, time to be arranged, third and fourth periods.

Laboratory. *Mondays, 1:30-4:30, third and fourth periods.* Dr. SHAPIRO.

Credit 3 units.

Experimental and theoretical methods of evaluating radiation fields and determining radiation dose rates. Special dosimetry problems for study in the laboratory are selected from the fields of health physics, nuclear engineering and nuclear medicine.

Environmental Health 3a,b and 3c,d. Occupational Medical Clinics

Clinics, Peter Bent Brigham Hospital, *Saturdays, 9:30-11:30, first and second periods.* Dr. MILLER.

Clinics, Lemuel Shattuck Hospital, two hours a week, time to be arranged, third and fourth periods. Dr. TYLER.

Credit 1 unit for each clinic series.

Occupational Medical Clinics at teaching hospitals will be offered in all four periods. The clinics at the Peter Bent Brigham Hospital and the Lemuel Shattuck Hospital will emphasize the effect that non-occupational disease may have on the working capacity of the individual.

The clinics are limited to physicians and will not be offered if less than four enroll.

Environmental Health 4c,d. Occupational Medical Clinics

Clinics, Massachusetts General Hospital, *Fridays, 1:30-3:30, third and fourth periods.* Instructor to be announced.

Credit 1 unit.

These clinics are concerned with diseases due to occupation, such as silicosis, beryllium intoxication, coal miner's pneumoconiosis, and lead poisoning. Special clinics will be held in ophthalmology and dermatology.

The clinics are limited to physicians and will not be offered if less than four enroll.

Environmental Health 5a,b,c,d. Aviation Health and Safety

Seminars. *Wednesdays, 1:30-3:30, first and second periods; Wednesdays, 10:30-12:30, third and fourth periods.* Dr. McFARLAND.

Credit 1 unit each period.

The purpose of these seminars is to integrate the work in the basic courses of public health and preventive medicine with the specialized problems of aviation health and safety. Lectures and discussions are arranged throughout

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the year, led by the students, the instructor, and various biological and medical specialists in the University. Visiting lecturers from other universities and research centers also participate in the seminar.

Admission is by permission of the instructor.

Environmental Health 6c,6d. Human Factors in Occupational Performance and Safety

Lectures and demonstrations. *Tuesdays and Thursdays, 11:30-12:30, third period; Fridays, 8:30-10:30, fourth period.* Dr. McFARLAND.

Credit 1 unit in each period.

In the third period, the lectures and discussions emphasize the application of experimental psychology, anthropology, and biotechnology to the problems of occupational performance and adjustment. Consideration is given to the matching of psychological and physical abilities to job requirements. Emphasis is placed on the importance of designing equipment and work practices in terms of human capabilities and limitations, including those related to fatigue, aging, and environmental stress. In the fourth period the lectures and seminars explore interdisciplinary methods in the analysis and prevention of accidents and injuries. While the major emphasis is on occupational safety, the prevention of other types of accidents is also included.

With permission of the instructor, either period may be taken separately.

Environmental Health 7d. Occupational Medicine

Lectures. Two hours twice each week, time to be arranged, fourth period. Dr. FERRIS and Dr. WILKINS.

Credit 2 units.

The topics in this course will include the administration and organization of occupational medical departments, physical examinations, rehabilitation, counselling, and medico-legal problems. Guest lecturers will present problems associated with specific industries. The course will not be offered if less than four enroll.

Environmental Health 8c,d. Community Air Pollution

Lectures, demonstrations and seminars. Two hours a week, time to be arranged, third and fourth periods. Dr. FIRST and Staff of the Division.

Credit 2 units.

An advanced lecture and seminar course for students in industrial hygiene, sanitary engineering and environmental physiology. It will cover micro-meteorology and its relation to air pollution site surveys, community air pollution control and appraisal, and solid waste disposal by incineration.

Environmental Health 30e. Field Work

Credit 1 unit.

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A week of supervised field observation will be offered from January 31 to February 5, 1966. Students may choose appropriate visits to medical or industrial hygiene departments of industries, airports, and other agencies which have operations or research in the field of environmental health.

Environmental Health 40c,d. Operations Research in Environmental Health Engineering

Lectures and computer exercises. Three hours a week, time to be arranged, third and fourth periods. Dr. HARRINGTON.

Credit 3 units.

An introduction to the concepts and techniques of operations research, applied to problems of environmental health sciences and engineering. Topics will include the following: several interrelated mathematical techniques of optimization—Lagrangian methods, steepest descent, linear, non-linear and dynamic programming, approximation theory; systems analysis of air and water treatment processes; applications of queueing theory, Markov processes, and statistical decision theory; graph theoretic approach to solid wastes disposal and other transportation-type problems.

DEPARTMENT OF INDUSTRIAL HYGIENE

LESLIE SILVERMAN, S.B., S.M., S.M. IN ENG., S.D., *Professor of Engineering in Environmental Hygiene and Head of the Department*

GEORGE F. WILKINS, A.B., M.D., *Associate Clinical Professor of Occupational Medicine*

MELVIN W. FIRST, S.B., S.M., S.D., *Associate Professor of Applied Industrial Hygiene*

JACOB SHAPIRO, S.B., S.M., PH.D., *Assistant Professor of Biophysics in Environmental Hygiene*

WILLIAM A. BURGESS, S.B. IN M.E., S.M., *Assistant Professor of Environmental Health and Safety Engineering*

ROBERT E. YODER, S.B., S.D. IN HYG., *Assistant Professor of Radiological Hygiene* (Absent 1965-66)

FREDERICK J. VILES, JR., S.B., S.M., *Research Associate and Lecturer in Industrial Hygiene*

ALLEN D. BRANDT, S.B., S.M., S.D., *Visiting Lecturer on Industrial Hygiene Engineering*

NATHAN VAN HENDRICKS, B.E., CHEM.E., *Visiting Lecturer on Industrial Hygiene Engineering*

LAWRENCE S. COOKE, *Visiting Lecturer on Illumination*

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JAMES M. AUSTIN, B.A., M.A., S.D., *Visiting Lecturer on Meteorology and Air Pollution*

HORACE W. GERARDE, S.B., S.M., M.D., PH.D., *Visiting Lecturer in Industrial Toxicology*

JOHN K. DANE, A.B., LL.B., LL.M., *Visiting Lecturer on Workmen's Compensation*

JOHN H. LUDWIG, S.B., S.M., S.M. IN HYG., S.D. IN HYG., *Visiting Lecturer on Community Air Pollution*

CHARLES A. MITCHELL, S.B., S.M., *Assistant in Industrial Hygiene*

HEND GORCHEV, B.SC., S.M., PH.D., *Research Fellow in Industrial Hygiene*

HARRIET L. HARDY, A.B., M.D., *Lecturer on Medicine*

ALBERT O. SEELER, A.B., M.D., *Lecturer on Medicine*

The primary objective of this Department is to provide instruction and graduate research in the prevention and control of occupational disease. This is the historical objective and was the reason the Department was created over forty years ago. Another objective is to provide instruction and graduate research opportunities in the fields of air pollution control and radiological hygiene. The latter areas are related to the teaching efforts of the Department in the Division of Environmental Health Sciences and Engineering, providing instruction in the School of Public Health. Our faculty and staff offer courses for students in the Division of Engineering and Applied Physics of the Graduate School of Arts and Sciences.

Courses offered by the Department are open to physicians, engineers, physicists, chemists and biology majors. The basic course, Industrial Hygiene 1C,D, is for physicians as well as students with non-medical backgrounds. It covers the basic problems of Industrial Hygiene and Industrial Environments. Additional emphasis on Industrial Toxicology and Environmental Physiology is provided by the Department of Physiology. The Department of Physiology faculty provides a portion of the instruction in occupational health and industrial medicine. Industrial Hygiene 1C,D is the principal elective course for Master of Public Health candidates. It is also a basic course for Master of Industrial Health and Master of Science in Hygiene concentrators. The course in Industrial Air Analysis is required for the Master of Industrial Health and Master of Science in Hygiene programs, and is available to Master of Public Health candidates.

The other courses offered by the Department require prerequisites in various categories. It is desirable that all concentrators in this Department have a basic background in chemistry, physics and mathematics through calculus. Some of the courses in the Department carry "Engineering" numbers and

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provide direct course credit through the Division of Engineering and Applied Physics. Courses in air pollution and radiological hygiene are presented as inter-departmental courses by faculty from this Department. The material presented in lectures is supplemented with laboratory work as well as field observation.

The field of Industrial Hygiene and Occupational Health must keep pace with the numerous changes taking place in industry from year to year. Therefore, it should be evident that the subject material and course content will vary from year to year as the changes take place in industry and industrial practice.

A number of graduate level courses are offered to those wishing to pursue work beyond the master's degree. These are available to students in the School of Public Health as well as students in the Division of Engineering and Applied Physics. Research opportunities are available for projects in the three fields outlined above and a number of research fellowships and traineeships are available for qualified candidates.

Candidates for the Master of Public Health degree who elect to concentrate in Industrial Hygiene are normally expected to take the following courses in addition to satisfying the formal course requirements for the degree:

Industrial Hygiene 1c,d

Physiology 2b

Physiology 3c,d

Industrial Hygiene 1c,d. Basic Problems in Occupational Health and Industrial Environments

Lectures, laboratories, demonstrations and field trips. *Tuesdays and Thursdays, 8:30-10:30, third period; Mondays and Fridays, 10:30-12:30, fourth period; Wednesdays, 1:30-5, third and fourth periods.* Dr. SILVERMAN, Dr. FERRIS and Dr. HEIMANN.

Credit 7 units.

A course of lectures, demonstrations and inspections showing the relation of working conditions to health with special reference to control of industrial hazards, and of adverse conditions of temperature and humidity, the prevention, diagnosis and treatment of industrial disability and diseases, and workmen's compensation. (This course is classified as Eng. 282.)

Industrial Hygiene 2a,b. Industrial Air Analysis

Laboratory work. *Tuesdays and Thursdays, 1:30-4:30, first and second periods.* Mr. VILES and members of the department.

Credit 4 units.

Determination and interpretation of adverse conditions found in work places of all types, such as factories and mills, and in assembly halls; methods

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employed in determining physical properties of the air, such as temperature, humidity, and air motion; atmospheric impurities and normal constituents of the air — gases, dusts, bacteria, and pollens; efficiencies of protective devices such as masks and respirators.

Course 2a,b (Eng. 281) is intended for public health engineers and physicians enrolled in the Industrial Health program.

Industrial Hygiene 6a,b (Engineering 280). Industrial Ventilation and Air Conditioning

Lectures and laboratories. Two hours of lectures, three hours of laboratory a week, time to be arranged, first and second periods. Assistant Professor BURGESS and Dr. FIRST.

Credit 4 units.

Selected topics in industrial ventilation and air conditioning of interest to students in mechanical and environmental health engineering and industrial hygiene. Primarily for engineers and physical science majors.

Industrial Hygiene 7c,d (Engineering 286). Aerosol Technology

Lectures and laboratory work, at the School of Public Health. Two hours of lectures, three hours of laboratory a week, time to be arranged, third and fourth periods. Staff of the Department.

Credit 4 units.

A general discussion of aerosol properties and their behavior. An advanced course for engineers interested in air pollution evaluation and control.

Prerequisite: Industrial Hygiene 2a,b.

Industrial Hygiene 8c,d (Engineering 287). Radiological Engineering

Lectures. Given at the School of Public Health. Four hours a week, time to be arranged, third and fourth periods. Dr. SHAPIRO.

Credit 4 units.

A presentation of the basic theory and calculations utilized in radiation control and nuclear safety. Introduction to reactor physics; safeguards for preventing criticality and reactor accidents; radiation shielding; radiation damage; environmental reactor hazard analysis.

Prerequisites: Physics 101, Physics 111 or Environmental Health 2a,b.

Industrial Hygiene 17a,b,c,d,e.

Tutorial Program (Reading or Research). Time and credit to be arranged.

Reading or research assignments for individual tutorial work at a Master's degree level will be provided for qualified students in the fields of industrial hygiene, industrial ventilation, aerosol technology, radiological hygiene and

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air pollution control. Enrollment will be made by arrangement with the Head of the Department.

During 1965-66 a seminar on current problems in health physics and radiation physics will be offered in the third and fourth periods.

Industrial Hygiene 20. Research

Properly qualified students at the post-master's level or who have been accepted as doctoral candidates will be given opportunity to pursue independent research work on problems of industrial hygiene including occupational disease, toxicology, industrial ventilation, aerosol technology, air pollution control and radiological hygiene. Enrollment will be by arrangement with the Head of the Department.

DEPARTMENT OF PHYSIOLOGY

JAMES L. WHITTENBERGER, S.B., M.D., A.M. (hon.), *James Stevens Simmons Professor of Public Health, Professor of Physiology and Head of the Department*

ROSS A. MCFARLAND, A.B., PH.D., S.D. (hon.), *Daniel and Florence Guggenheim Professor of Aerospace Health and Safety*

JERE MEAD, S.B., M.D., *Professor of Physiology*

BENJAMIN G. FERRIS, JR., A.B., M.D., *Associate Professor of Environmental Health and Safety*

MARY O. AMDUR, S.B., PH.D., *Associate Professor of Toxicology*

HARRY HEIMANN, S.B., M.D., *Senior Research Associate in Environmental Health and Lecturer on Occupational Medicine*

WILLIAM H. FORBES, A.B., A.M., DR.PHIL., M.D., *Lecturer on Physiology*

N. ROBERT FRANK, A.B., M.D., *Assistant Professor of Physiology*

SHELDON D. MURPHY, S.B., PH.D., *Assistant Professor of Toxicology*

JOHN B. LITTLE, A.B., M.D., *Assistant Professor of Radiobiology*

HARBEN J. BOUTOURLINE-YOUNG, M.B.,B.S., D.C.H., M.D., *Research Associate in Physiology (Absent 1965-66)*

ROLAND C. MOORE, A.B., A.M., PH.D., *Research Associate in Occupational Safety*

HOWARD W. STOUTT, JR., A.B., A.M., PH.D., S.M. IN HYG., *Associate in Physical Anthropology*

HERVEY B. ELKINS, A.B., PH.D., *Lecturer on Industrial Toxicology*

DAVID W. FASSETT, A.B., M.D., *Visiting Lecturer on Occupational Medicine*

NORMAN H. MACKWORTH, M.B.,CH.B., DR.PHIL., *Senior Research Associate in Physiological Psychology*

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JOHN M. TYLER, A.B., M.D., *Research Associate in Physiology*

THOMAS J. CROWLEY, S.B., S.M., *Research Associate in Environmental Health and Safety*

DOROTHY B. CHAMBERLIN, S.B., M.D., M.P.H., *Research Associate in Physiology*

VILMA R. HUNT, B.D.S., M.A., *Research Associate in Physiology*

RONALD M. PICKETT, A.B., A.M., PH.D., *Research Associate in Experimental Psychology*

LUISA C. STIGOL, M.D., *Research Associate in Physiology*

GUNNAR L. GRIMBY, M.D., *Senior Research Fellow in Physiology*

ELIHU A. CHANNIN, A.B., M.D., *Research Fellow in Physiology*

PETER T. MACKLEM, A.B., M.D., *Research Fellow in Physiology*

MARGARET HITCHCOCK, B.SC., PH.D., *Research Fellow in Physiology*

TAMOTSU TAKISHIMA, M.D., D.M.S., *Research Fellow in Physiology*

ROBERT G. MONROE, A.B., M.D., *Associate in Pediatrics at the Children's Hospital*

DAVID E. LEITH, M.D., *Instructor in Anesthesia at the Medical School and Junior Associate in Surgery (Anesthesia) at the Peter Bent Brigham Hospital*

MARY ELLEN BECK WOHL, M.D., *Instructor in Pediatrics*

The Department of Physiology is a medical science department with interests that extend into several aspects of public health, particularly environmental health. Personnel in the Department include physicians, physiologists, psychologists, physical anthropologists, health and safety specialists, toxicologists, and specialists in radiobiology, occupational medicine and aerospace health and safety. Students and Research Fellows come with similarly varied backgrounds, and the research activities of the Department reflect this broad range of interests.

A fundamental aim of the Department is to provide basic information on the relationship of man to his physical and chemical environment. An introduction to these concepts is presented in the semi-elective course Environmental Health 1b that is offered by the Department. These concepts are examined in detail in specialized courses such as Environmental Physiology, Principles of Toxicology, Radiation Biology, and Human Factors in Occupational Performance and Safety. Specific research projects of members of the Department offer the qualified student an opportunity to gain experience in, and to develop a capacity for, critical evaluation of research methods and analysis.

The research programs include topics such as techniques of measuring

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respiratory function, effects of low-level ionizing radiation, human factors in transportation safety, effects of inhaled irritants on man and animals, causation of chronic non-specific respiratory disease, exercise and work physiology, and factors involved in fitting the machine and work environment to the capabilities of human performance.

International interests of the Department include a cross-cultural study in Italy and the United States of America that is concerned with environmental factors and their effect on growth and development of school-age children. Another study involves attempts to determine the causation of chronic non-specific respiratory diseases by comparing results obtained by comparable methods in various countries.

Physiology 1a,b. Human Physiology

Lectures, laboratory and demonstrations. *Tuesdays, 10:30-12:30, Thursdays, 11:30-12:30, first period; Tuesdays, 10:30-12:30, Thursdays, 10:30-11:30; second period.* Dr. MEAD, Dr. FRANK and associates.

Credit 3 units.

This course is intended for students who lack a background in physiology. The time will be divided approximately equally among cellular physiology, organ and organ system physiology, and function of the total organism. The purpose of the laboratory exercises will be to give the students some experience with problems of observing living systems.

Prerequisites: College courses in physics, chemistry and mathematics.

Physiology 2b. Environmental Physiology

Lectures and conferences. *Tuesdays, 4:30-5:30 and Thursdays, 11:30-12:30, second period.* Dr. FORBES.

Credit 1 unit.

This course is intended for students specializing in occupational health and will take up in greater detail some of the subjects considered in Environmental Health 1b.

In general students who take Environmental Health 1b should not take Physiology 2b.

The course will begin with a discussion of natural and artificial environments with particular reference to industrial workers. It will then take up human tolerance of high and low temperatures, physical fitness and its measurement, muscular work and the efficiency of various types of muscular work in industry, fatigue, and the effects of age.

Master of Science in Hygiene candidates who wish to take this course must have had Physiology 1a,b or the equivalent.

Physiology 3c,d. Principles of Toxicology

Lectures and laboratory work. *Tuesdays, 2:30-4:30, Fridays, 3:30-5:30,*

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third period; Tuesdays, 2:30-3:30 and Fridays, 3:30-5:30, fourth period. Dr. AMDUR and Dr. MURPHY.

Credit 2.5 units.

This course will present an introduction to the effects of toxic chemical agents on living organisms with particular reference to experimental techniques of assessing toxicity. Several classes of toxic agents will be studied with respect to mechanisms of action on living tissues, functional changes resulting from exposure, and methods of evaluating the damage produced.

Prerequisite: Physiology 1a,b or equivalent.

Physiology 4d. Special Topics in Respiratory Physiology

Lectures. Two hours a week, time to be arranged, fourth period. Dr. MEAD and associates.

Credit 1 unit.

This course will cover special topics in respiratory physiology, according to the interests of the students. It is intended primarily for students in the aviation medicine program. Other students who are specializing in environmental health may enroll with the consent of the instructor.

Physiology 5c,d. Radiation Biology

Lectures and laboratory work. *Lectures, Tuesdays, 4:30-5:30, and Thursdays, 3:30-4:30, third period; Tuesdays and Thursday, 3:30-4:30, fourth period; Laboratory, Mondays, 1:30-4:30, third and fourth periods.* Dr. LITTLE.

Credit 3 units.

This course deals with the biological effects of ionizing radiation and is divided into two parts, cellular and mammalian radiation biology. Included in the first will be a discussion of elementary target theory, radiation chemistry, effects on macromolecules, cellular and chromosomal effects, and recovery processes. The second part will cover the acute and long-term effects of radiation with emphasis on man, as well as a discussion of environmental sources of radiation and the characteristics of internal and external human exposure.

Prerequisites: Environmental Health 2a,b, Physiology 1a,b, or equivalents.

Physiology 17a,b,c,d,e. Tutorial Program

Time and credit to be arranged.

Opportunities are provided for tutorial work at a master's degree level in the fields of respiratory physiology, toxicology, environmental hygiene and occupational medicine.

Physiology 20. Research

Doctoral candidates and other properly qualified students may undertake laboratory or field research by arrangement with the Head of the Department.

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DEPARTMENT OF SANITARY ENGINEERING

HAROLD A. THOMAS, JR., S.B., S.M., S.D., *Gordon McKay Professor of Civil and Sanitary Engineering and Acting Head of the Department*

J. CARRELL MORRIS, S.B., A.M., PH.D., A.M. (hon.), *Gordon McKay Professor of Sanitary Chemistry*

WERNER STUMM, DR.PHIL., A.M. (hon.), *Gordon McKay Professor of Applied Chemistry*

RICHARD L. WOODWARD, B.S.C.E., S.M., PH.D., *Senior Research Associate and Lecturer in Sanitary Engineering*

MYRON B. FIERING, A.B., S.M., PH.D., *Assistant Professor of Engineering and Applied Mathematics*

JOSEPH J. HARRINGTON, B.C.E., A.M., PH.D., *Assistant Professor of Environmental Health Engineering*

EDWARD W. MOORE, A.B., S.M., *Lecturer on Sanitary Engineering*

H. NUGENT MYRICK, S.B., S.M., D.SC., *Instructor in Sanitary Engineering*

See listing of Environmental Health Courses on pages 42 and 45 for offerings of this Department in the School of Public Health (Environmental Health 1d and 40c,d).

The following courses of instruction offered in the Division of Engineering and Applied Physics of the Graduate School of Arts and Sciences are open to properly qualified students:

Engineering 250a. Design of Water Resource Systems. Professor THOMAS.

Engineering 250b. Design of Water Resource Systems. Professor THOMAS.

Engineering 270a. Water Resource Engineering. Dr. WOODWARD.

Engineering 271a. Water Chemistry. Professor STUMM.

Engineering 271b. (hf) Processes in Water and Waste Treatment. Professor MORRIS.

Engineering 272b. Chemistry and Biology of Natural Waters. Professor STUMM.

Engineering 274. Water Resources Seminar. Professor THOMAS and associates.

Engineering 275. Seminar: Industrial Water and Wastes. Mr. MOORE.

Engineering 276. Advanced Techniques for Water Analysis. Professor STUMM.

Engineering 277. Surface Chemistry. Professor STUMM.

Engineering 278. Rate Processes. Professor MORRIS.

Engineering 288. Biological Systems. (To be omitted in 1965-66)

Engineering 289. Applied Electrochemistry. Professor STUMM.

Engineering 292. Chemistry of Nuclear Materials. Professor MORRIS.

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DEPARTMENT OF BIOSTATISTICS

ROBERT B. REED, A.B., A.M., PH.D., A.M. (hon.), *Professor of Biostatistics and Head of the Department*

JANE WORCESTER, A.B., DR.P.H., *Professor of Biostatistics and Epidemiology*

JACOB J. FELDMAN, PH.D., *Senior Research Associate in Biostatistics and Lecturer on Biostatistics*

LENIN A. BALER, A.B., A.M., PH.D., S.M. IN HYG., S.D. IN HYG., *Assistant Professor of Psychology*

DAVID M. HEER, A.B., A.M., PH.D., *Assistant Professor of Biostatistics and Demography*

MARGARET E. DROLETTE, A.B., M.P.H., *Associate in Biostatistics*

PAUL M. DENSEN, A.B., S.D., *Visiting Lecturer on Biostatistics*

MARVIN N. GLASSER, B.B.A., M.P.H., S.D. IN HYG., *Research Associate in Biostatistics and Epidemiology*

MARGARET B. HOFF, A.B., S.M., *Assistant in Biostatistics and Maternal and Child Health*

ANTHONY F. BARTHOLOMAY, A.B., A.M., S.D. IN HYG., *Assistant Professor of Mathematical Biology in the Department of Medicine*

The teaching aims of the Department may be divided very generally into three categories:

First, it is essential for workers in all branches of public health to be able to draw justified conclusions from numerical data and to base logical action on these conclusions. This applies to the administrator who must evaluate problems and the results of his activities, as well as to the epidemiologist and the research worker who must apply statistical technics to their laboratory and field problems. The required course in Biostatistics is therefore designed to give a minimum command of simple statistical methodology to all students.

Second, it is essential for field and laboratory researchers to be able to use statistical methods in planning and analyzing their experiments and problems. Elective courses are designed to provide an introduction to methodology in this area. These courses are adapted to the needs of students of this School, many of whom have broad backgrounds in biological sciences while few have extensive preparation in mathematics. A minimum of mathematical exposition is therefore included in courses intended for students in these categories. Instead the emphasis is on understanding the statistical procedures and the ability to carry out indicated analyses effectively.

Third, there is a smaller group of students particularly interested in pursuing further work along mathematical lines. Their requirements are fulfilled,

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on the one hand, by the provision of advanced and seminar courses in the Department; on the other, by the offerings of the Department of Statistics in the Graduate School of Arts and Sciences. Students with mathematical backgrounds who are working in biology, or medical scientists with an understanding of basic mathematics, will be interested in the teaching and research program in Mathematical Biology offered by Dr. Bartholomay at the Medical School. Properly qualified students at the School of Public Health may arrange for instruction in this area of knowledge.

Training in the use of data processing equipment is available in the Data Processing Center operated by the Department. This Center is equipped with an IBM 1620 Computer and basic punch card machines including a 101 Statistical Sorter. The University Computer Center, located in Cambridge and equipped with an IBM 7094 Computer, also provides an opportunity to study computer technics.

Candidates for the Master of Public Health degree who elect to concentrate in Biostatistics are normally expected to take the following courses in addition to satisfying the formal course requirements for the degree:

Biostatistics 2c,d

Biostatistics 15a,b,c,d

Interdepartmental 4c,d

Biostatistics 1a,b. Principles of Biostatistics

Lectures and discussions. *Tuesdays and Thursdays, 8:30-9:30, first and second periods.*

Laboratory. *Thursdays or Fridays, 1:30-4:30, first and second periods.*
Staff of the Department.

Credit 3.5 units.

Required of Master of Public Health and Master of Science in Hygiene candidates.

Lectures, discussions and laboratory exercises introduce the student to demographic concepts: the structure of the population and the use of the life table; the nature and composition of rates and their use from administrative and epidemiological points of view. The course forms an introduction to the theory of measurements and distributions, including the testing of significance of differences and the interaction of variables. Finally, the student is introduced to basic concepts of probability and association, sampling technics and construction of controlled experiments such as clinical trials.

Biostatistics 2c,d. Statistical Methods in Research

Lectures, discussions and laboratory. *Tuesdays and Thursdays, 1:30-4:30, third and fourth periods.* Dr. REED and Dr. WORCESTER.

Credit 4 units.

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This course, a continuation of Biostatistics 1a,b, introduces the student to technical statistical procedures important in problems of laboratory and field research. Topics included are further considerations of probability and correlation together with an introduction to procedures used in the planning of experiments including variance analysis, non-parametric methods, dosage response and maximum likelihood. Statistical technics introduced in advanced courses in epidemiology will be amplified and supplemented.

Prerequisites: Basic preparation in statistics and epidemiology.

Biostatistics 15a,b,c,d. Design of Investigations

Seminars. *Wednesdays, 1:30-3:30, all four periods.* Staff of the Department.

Credit 1 unit in each period.

This course is for students with a major interest in biostatistics. Participants will select a biostatistical problem in apparent need of investigation, and will prepare and present for group discussion a summary of the present status of knowledge of the problem and the design of a study directed towards advancement of present knowledge. Given in conjunction with Epidemiology 15a,b,c,d.

Admission subject to the approval of the Head of the Department.

Biostatistics 17a,b,c,d,e. Tutorial Program

Time and credit to be arranged.

An opportunity for tutorial work at master's level will be given interested students. This will involve not only work in statistical fields, but can include problems arising in the course of special programs in other departments. Schedules and credit may therefore be arranged jointly with such other departments.

During the week of January 31 to February 5, 1966, opportunity will be provided for studying the use of the equipment of the School's Data Processing Center. Emphasis will be placed on instruction in Fortran programming for the IBM 1620 Computer.

Biostatistics 20. Research

Individual guided research at doctoral level, for candidates for the Doctor of Public Health, Doctor of Science in Hygiene or other doctoral degrees. The work may be part of the program for a doctorate in this Department or may be integrated with doctoral research in other departments.

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DEPARTMENT OF DEMOGRAPHY AND HUMAN ECOLOGY

ROGER REVELLE, A.B., PH.D., SC.D. (hon.), *Richard Saltonstall Professor of Population Policy and Director of the Center for Population Studies*

JOHN C. SNYDER, A.B., M.D., LL.D., *Henry Pickering Walcott Professor of Public Health and Acting Chairman of the Department*

DIETER KOCH-WESER, M.D., S.M., PH.D., *Associate Professor of Tropical Health and Human Ecology, and Assistant to the Dean for Latin American Programs*

WILLIAM H. FORBES, A.B., A.M., DR.PHIL., M.D., *Lecturer on Physiology, Assistant to the Dean, and Faculty Advisor to Foreign Students*

JOHN B. WYON, B.A., M.B., B.CH., M.P.H., *Assistant Professor of Population Studies*

DAVID M. HEER, A.B., A.M., PH.D., *Assistant Professor of Biostatistics and Demography*

STEPHEN J. PLANK, PH.B., A.B., M.D., M.P.H., DR.P.H., *Assistant Professor of Population Studies*

ROBERT G. POTTER, JR., A.B., A.M., PH.D., *Research Associate in Demography*

LAILA S. HAMAMSY, A.B., M.S.S., PH.D., *Senior Research Fellow in Population Studies*

CHIEH LU, M.D., M.P.H., *Research Fellow in Demography and Human Ecology*

IRENE PETRITSI, A.B., M.P.H., *Research Fellow in Population Studies*

HSIN-YING WU, M.D., M.P.H., D.M.S., *Research Fellow in Demography and Human Ecology*

HILTON A. SALHANICK, A.B., A.M., PH.D., M.D., *Professor of Obstetrics and Gynecology and Member of the Center for Population Studies*

The Harvard School of Public Health has been involved in studies on population problems since 1953 through an investigation conducted by its Department of Epidemiology in collaboration with the Government of India, the Ludhiana Christian Medical College, and The Rockefeller Foundation. These initial efforts have strengthened the view that our current knowledge concerning the basic factors which determine changes in the density and quality of populations is inadequate. It is the conviction of the administration of the Harvard School of Public Health that schools of public health and their parent universities should participate actively in the search for the knowledge which communities and nations must have in order to advance towards their goals in education, economic development and health. With this responsibility in mind, the administration of the School has concluded that population problems are foremost among the subjects appropriate for study by the profession of public health. As a step toward meeting this responsibility, a new depart-

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ment was established in the Faculty of Public Health in 1962-63 to conduct research and to provide instruction in population problems and those aspects of human ecology which are related to man's efforts to control and change his biophysical and social environment. When adequate financial support has been obtained, the new department will include experts in the biological and social sciences as well as representatives of the public health sciences. The department will be an integral part of the University-wide Center for Population Studies.

The activities of the Department of Demography and Human Ecology will be international in scope, and, as in other departments in the Faculty of Public Health, will be concerned with the advancement of knowledge through observation and experiment, placing emphasis partly on the acquisition of knowledge for its own sake and partly on the application of knowledge for the accomplishment of social goals. The development of the courses of instruction which are listed below is the initial step toward a more comprehensive academic program. The formal courses and the tutorial instruction are intended to provide students with an understanding of the interactions between demographic change and health objectives, and to prepare them for effective participation in population programs in various regions, whether as administrators, research workers, or educators.

Candidates for the Master of Public Health degree who elect to concentrate in Demography and Human Ecology are normally expected to take the following courses in addition to satisfying the formal course requirements for the degree:

- Demography 40a,b
- Demography 41c,d
- Demography 42b
- Demography 17a,b,c,d

Demography and Human Ecology 40a,b. Introduction to Ecology and Demography

Lectures, seminars and laboratory exercises. *Mondays, 1:30-3:30, first and second periods.* Dr. HEER, Dr. PLANK, Dr. KOCH-WESER and associates.

Credit 2 units.

In the first part of the course the concept of ecology is developed through studies of plant and animal populations. Application is made to man and his environment. Man is viewed as part of an ecosystem. Factors limiting populations are discussed, and the idea of an ecological concept of cause is developed.

The second part of the course deals with the materials and methods of the demographic study of populations. Particular emphasis is given to measuring the determinants of population change and the relation between population growth and health.

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Demography and Human Ecology 41c,d. Problems of Rapid Population Growth

Seminars. Two hours a week, time to be arranged, third and fourth periods. Staff of the Department.

Credit 2 units.

In the first part of the course important works from the literature are assigned to the students for critical evaluation. In the second part each student selects a problem in need of investigation; he prepares a summary of existing knowledge relevant to the problem and discusses with the group his proposal for a program of research and action.

Admission is limited and is subject to approval of Department staff.

Prerequisite: Demography and Human Ecology 40a,b.

Demography and Human Ecology 42b. Demographic Techniques

Lectures. *Mondays, 3:30–5:30, second period.*

Laboratory. *Tuesdays, 1:30–3:30, second period.* Dr. HEER.

Credit 1.5 units.

A course on demographic techniques with emphasis on the correction of vital statistics and census data, measurement of nuptiality, fertility, contraceptive effectiveness and population growth, and on the preparation of population projections.

Prerequisite: Biostatistics 1a,b.

Demography and Human Ecology 17a,b,c,d. Tutorial Program

Time and credit to be arranged.

Students at the master's level may make arrangements for tutorial work and special reading on topics related to the causes or treatment of population problems. There may be an opportunity to consider the design of studies, programs or analysis of data.

Demography and Human Ecology 20. Research

Doctoral candidates may undertake research in the Department or may integrate research in this field with a doctoral program in another department.

Demography and Human Ecology 30e. Field Visits

January 31–February 5, 1966.

Credit 1 unit.

Students majoring in the Department of Demography and Human Ecology participate in field visits to the Demographic Section of the United Nations and to organizations and clinics which are currently active in family planning work.

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Additional Field Study

At the end of the academic year a field visit may be arranged for students majoring in the Department of Demography and Human Ecology.

Limited to ten students.

In addition to the courses listed above, Dr. Heer will give a course in the Department of Social Relations of the Faculty of Arts and Sciences, as follows:

Social Relations 192. Problems of Population

Half course (spring term). M., W., F., at 9:00. Dr. DAVID M. HEER.

This course will review the history of the world's population and the social consequences of different population sizes and growth rates. Special attention will be paid to a cross-cultural analysis of the social determinants of fertility, mortality and migration.

DEPARTMENT OF EPIDEMIOLOGY

BRIAN MACMAHON, M.D., PH.D., D.P.H., S.M. IN HYG., *Professor of Epidemiology and Head of the Department*

JANE WORCESTER, A.B., DR.P.H., *Professor of Biostatistics and Epidemiology*

GEORGE B. HUTCHISON, A.B., M.D., M.P.H., *Associate Professor of Epidemiology*

THOMAS F. PUGH, M.D., M.P.H., *Associate Professor of Applied Epidemiology*

HERBERT L. LEY, JR., M.D., M.P.H., *Associate Professor of Epidemiology and Microbiology*

SAMUEL G. MCCLELLAN, A.B., M.D., M.P.H., *Lecturer on Applied Epidemiology*

ASCHER J. SEGALL, M.D., M.P.H., DR.P.H., *Assistant Professor of Epidemiology*

THEODOR ABELIN, DR.MED., M.P.H., *Assistant Professor of Epidemiology*

RALPH S. PAFFENBARGER, JR., A.B., B.M., M.D., DR.P.H., *Lecturer on Epidemiology*

MORRIS SIEGEL, M.D., M.P.H., *Visiting Lecturer on Epidemiology*

EVA J. SALBER, M.B., CH.B., D.P.H., M.D., *Senior Research Associate in Epidemiology*

MARVIN N. GLASSER, B.B.A., M.P.H., S.D. IN HYG., *Research Associate in Biostatistics and Epidemiology*

MAUREEN K. MOLLOY, A.B., M.D., S.M. IN HYG., *Research Fellow in Epidemiology*

MANNING FEINLEIB, A.B., M.D., M.P.H., *Teaching Fellow in Epidemiology*

LOUIS WEINSTEIN, S.B., S.M., PH.D., M.D., *Lecturer on Infectious Diseases*

HERMANN LISCO, M.D., *Lecturer on Pathology*

The formal courses offered by the Department of Epidemiology are designed

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primarily for the Master of Public Health curriculum. Epidemiology 1a,b deals with epidemiologic principles and methods as they apply to all varieties of disease, infectious and non-infectious, acute and chronic. Systematic reviews of the infectious diseases are given in Microbiology and Tropical Public Health 1a,b,c and of the non-infectious diseases in Epidemiology 2c,d. Epidemiology 3b, 4c,d and Epidemiology and Microbiology 5d are elective courses for students with special interests.

A major objective of the Department is to encourage original investigation in epidemiology. In addition to tutorial work in a specific research problem (Epidemiology 17), opportunity for experience in study design is provided in Epidemiology 15.

A training program in epidemiology supported by the National Institutes of Health, U.S. Public Health Service, provides opportunities for training in epidemiology at a variety of levels (see page 108). In the selection of graduate candidates for this program, preference will be given to those intending to proceed to investigative work at the doctoral level.

Candidates for the Master of Public Health degree who elect to concentrate in Epidemiology are normally expected to take the following courses in addition to satisfying the formal course requirements for the degree:

Epidemiology 2c,d

Epidemiology 15a,b,c,d

Epidemiology 1a,b. Principles of Epidemiology

Lectures. *Tuesdays, 9:30-10:30, Thursdays, 9:30-11:30, first period; Tuesdays and Thursdays, 9:30-10:30, second period.* Dr. MACMAHON and associates.

Credit 2.5 units.

Required of Master of Public Health candidates.

Lectures on the principles, purposes and methods of epidemiology. Illustration is by reference to classic epidemiologic investigations and through laboratory exercises.

Epidemiology 2c,d. Epidemiology of Non-Infectious Disease

Lectures. *Mondays, Wednesdays, and Fridays, 8:30-9:30, third period; Mondays and Wednesdays, 8:30-10:30, fourth period.* Dr. HUTCHISON and associates.

Credit 3 units.

One of the six semi-elective courses from which Master of Public Health candidates are required to elect a minimum of 12.5 credit units.

A course concerned with the etiology of diseases not at present known to be associated with infectious agents. Special attention is given to the mental disorders, to the degenerative and neoplastic diseases, and to the methodologic

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difficulties associated with the epidemiologic investigation of chronic diseases. Through illustrative studies, problems such as the establishment of criteria for definition, the description of disease course, and the investigation of causal relationships extending over long time periods are discussed. Systematic reviews of the present state of knowledge regarding certain disease states are presented.

Epidemiology 3b. Clinical Problems in Infectious Disease

Lectures and clinics. *Tuesdays, 4-6, second period.* Dr. WEINSTEIN.

Credit 1 unit.

Problems of diagnosis, treatment and control of the common acute communicable diseases of temperate climates.

Epidemiology 4c,d. Human Heredity

Lectures. *Tuesdays and Thursdays, 4:30-5:30, third and fourth periods.* Dr. HUTCHISON.

Credit 2 units.

Lectures on the methodology of investigating problems of human heredity and on the current state of knowledge of certain specific areas in this field. Introductory lectures will review the principles of classical genetic theory with particular emphasis on theory peculiar to human genetics.

The methods for investigating family patterns of heredity, twin studies, effects of consanguinity and heterosis, gene linkage and the inheritance of continuous traits, such as height and IQ, will be presented. Students will be given problems illustrating these methods. Current knowledge of the heredity of such factors as mongolism, pyloric stenosis, and the human blood groups will be reviewed.

Epidemiology and Microbiology 5d. Epidemiologic Problems in Infectious Disease

Conferences, seminars, laboratory exercises. *Mondays and Wednesdays, 10:30-12:30, fourth period.* Dr. LEY and associates.

Credit 2 units.

A course given by the staffs of the Departments of Microbiology, Epidemiology and Tropical Public Health providing experience in solving epidemiologic problems in communicable disease.

Epidemiology 15a,b,c,d. Design of Investigations

Seminars. *Wednesdays, 1:30-3:30, all four periods.* Staff of the Department.

Credit 1 unit in each period.

This course is for students with a major interest in epidemiology. Participants will select an epidemiologic problem in apparent need of investigation, and will prepare and present for group discussion a summary of the present

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status of knowledge of the problem and the design of a study directed towards advancement of present knowledge. Given in conjunction with Biostatistics 15a,b,c,d.

Admission subject to the approval of the Head of the Department.

Epidemiology 17a,b,c,d,e. Introduction to Research

Participation in departmental research in close association with a staff member. Time and credit by arrangement with the Head of the Department.

Prerequisite: Epidemiology 15.

Epidemiology 20. Research

Research for doctoral candidates.

DEPARTMENT OF MATERNAL AND CHILD HEALTH

WILLIAM M. SCHMIDT, S.B., M.D., A.M. (hon.), *Professor of Maternal and Child Health and Head of the Department*

ELIZABETH P. RICE, A.B., S.M., *Associate Professor of Public Health Social Work*

LEON STERNFELD, S.B., M.D., PH.D., M.P.H., *Associate Professor of Applied Maternal and Child Health and Deputy Commissioner of Health, Commonwealth of Massachusetts*

ISABELLE VALADIAN, M.D., M.P.H., *Assistant Professor of Maternal and Child Health*

JAMES E. TEELE, A.B., A.M., PH.D., *Assistant Professor of Sociology*

HAROLD JACOBZINER, S.B., M.D., M.P.H., *Visiting Lecturer on Maternal and Child Health*

ARTHUR J. LESSER, A.B., M.D., M.P.H., *Visiting Lecturer on Maternal and Child Health*

EDWIN M. GOLD, S.B., M.D., *Visiting Lecturer on Maternal and Child Health*

ALAN F. GUTTMACHER, A.B., M.D., *Visiting Lecturer on Maternal and Child Health*

HELEN D. COHN, M.P.H., *Instructor in Applied Public Health Nursing*

ILSE E. GORBACH, A.B., M.D., M.P.H., *Instructor in Maternal and Child Health*

BENJAMIN SACHS, A.B., M.D., M.P.H., *Instructor in Maternal and Child Health*

RUTH M. BUTLER, A.B., S.M., *Research Associate in Social Work*

LEO MILLER, A.B., S.M. IN S.S., M.P.H., PH.D., *Research Associate in Social Work*

DEREK ROBINSON, M.B., CH.B., D.P.H., D.C.H., M.D., *Research Associate in Maternal and Child Health*

MIRIAM C. EKDAHL, S.B., S.M. IN S.S., *Assistant in Social Work*

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RUTH A. COWIN, S.B., S.M., *Assistant in Social Work*

MARGARET B. HOFF, S.B., S.M., *Assistant in Biostatistics and Maternal and Child Health*

CHARLYNE D. COSTIN, A.B., M.S.S.W., *Assistant in Social Work*

ELINANN R. REYNOLDS, A.B., M.S.S.A., *Assistant in Social Work*

CHARLES A. JANEWAY, A.B., M.D., A.M. (hon.), *Thomas Morgan Rotch Professor of Pediatrics*

DUNCAN E. REID, S.B., M.D., A.M. (hon.), *William Lambert Richardson Professor of Obstetrics*

CLEMENT A. SMITH, A.B., A.M., M.D., A.M. (hon.), S.D. (hon.), *Professor of Pediatrics at the Boston Lying-In Hospital*

WILLIAM BERENBERG, A.B., M.D., *Assistant Clinical Professor of Pediatrics*

LONDON SNEDEKER, A.B., M.D., M.P.H., *Instructor in Pediatrics*

The teaching program in the Department is designed to present the content of Maternal and Child Health and Crippled Children's Services: the needs to be met by such services, the problems affecting the health and well-being of mothers and children, the major program aims, and the methods of administration of health and welfare services.

First, it provides to students in all branches of public health the basic principles underlying the protection of mothers during maternity and of normal and handicapped children. Emphasis is based on total health needs, physical, social, and emotional. Knowledge of health measures and of community services for children and families is also presented.

Second, it provides to students interested in studying maternal and child health more intensively, further knowledge of health problems in this field and the programs and methods developed to serve mothers and children. Program planning, principles of organization, procedures and administration of Maternal and Child Health Services, including organized care of handicapped children, are analyzed.

Third, it provides to Maternal and Child Health students in doctoral programs, tutorial sessions and guidance with respect to their original investigations in Maternal and Child Health.

Fellowships are available for physicians who have a major interest in Maternal and Child Health. (See Page 108.)

Candidates for the Master of Public Health degree who elect to concentrate in Maternal and Child Health are normally expected to take the following courses in addition to satisfying the formal course requirements for the degree:

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Maternal and Child Health 2c,d

Maternal and Child Health 15a,b

Maternal and Child Health 17b,c,d

Maternal and Child Health 1c. Principles of Maternal and Child Health

Lectures. *Mondays and Fridays, 10:30-12:30, third period.* Dr. SCHMIDT and associates.

Credit 2 units.

One of the six semi-elective courses from which Master of Public Health candidates are required to elect a minimum of 12.5 credit units.

This course presents a systematic review of the principles which underlie programs concerned with maternal and child health, handicapped children, and the related services of child welfare.

Maternal and Child Health 2c,d. Problems and Programs in Maternal and Child Health

Advanced Seminar. *Mondays, 3:30-5:30, third period; Wednesdays, 1:30-3:30, third and fourth periods; Fridays, 8:30-10:30, fourth period.* Dr. SCHMIDT, Miss RICE, Dr. VALADIAN and associates.

Credit 4 units.

Presentation and discussion of programs in maternal and child health and of services for handicapped children. Selected aspects of programs are examined with particular reference to the methods of administration in relation to program goals.

A sequence of lecture and discussion sessions is included on social problems and available social services for children.

This course is an advanced course for students majoring in Maternal and Child Health but may be elected by other students with the permission of the Head of the Department.

Maternal and Child Health 3d. Research Approach to Growth, Development and Health of the Child

Seminars. Two hours twice each week, time to be arranged, fourth period. Dr. VALADIAN, Dr. REED and associates.

Credit 2 units.

This course deals with the methods for obtaining and evaluating data on child growth, development, and health, and the construction of norms. Particular attention is paid to problems involved in the study of interrelationships between various aspects of the child's progress and between the child and his background and environment.

Illustrative material from the Longitudinal Study of Child Health and Development conducted in this Department since 1930 by Dr. Harold C.

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Stuart, Professor *Emeritus*, as well as data from other studies in this country and abroad are used.

Admission open to any student subject to approval of instructor.

Maternal and Child Health 15a,b. Departmental Seminar

Seminars. *Alternate Wednesdays, 1:30-3:30, first and second periods.*
Staff of the Department.

Credit 1 unit.

Seminars on topics of special interest in Maternal and Child Health. Discussions concerning research or demonstrations in progress, legislative developments and new programs, and current reports in the literature. Major responsibility will be taken by Departmental staff members supplemented by student participation.

Primarily for students whose special interest is Maternal and Child Health and open to others with the consent of the Head of the Department.

Maternal and Child Health 17b,c,d,e. Tutorial Program

Time and credit to be arranged, second, third and fourth periods.

Students whose field of interest is in Maternal and Child Health may devote time to be arranged to individual work under guidance. Each program will be arranged between the student and advisor during the fall term, and approved in advance by the Head of the Department.

Maternal and Child Health 20. Research

Students at the doctoral level may undertake research in Maternal and Child Health by arrangement with the Head of the Department.

Maternal and Child Health 30e. Field Study

January 31-February 5, 1966

Credit 1 unit.

A study visit to Puerto Rico is arranged in cooperation with the Department of Maternal and Child Health of the University of Puerto Rico, School of Medicine, Division of Preventive Medicine and Public Health. The work of the week is devoted mainly to an observation of MCH activities and programs for handicapped children. It includes an opportunity to observe family planning services. Observation of the work of regional hospitals and of district health centers in the smaller towns of the island is provided.

Consent of the Head of the Department is required for admission to this course. Enrollment must be made by the end of the first period. (See p. 106 for an estimate of the cost.)

Other field experience may be arranged as time permits.

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Students whose special field of interest is Maternal and Child Health and who do not have sufficient previous experience will be encouraged to have a period of field study before registration. Field study may also be undertaken after the completion of the academic year in a program arranged by the staff of the Department.

Maternal and Child Health 40d. Adolescence and Youth: Sociological Concepts Related to Health Care

Lectures and seminars. *Two hours a week, time to be arranged, fourth period.* Dr. TEELE and associates.

Credit 1 unit.

This course is developed around a multi-disciplined approach to adolescent and youth behavior in the United States and presents material on socio-psychological theories and research in the field. Emphasis is placed upon a review of social science research into socialization practices, adolescent culture, and adolescent problems, including health problems. Aspects of mental and physical illness in the adolescent population are also examined. The aim of the course is to introduce the student to the apparent social and health consequences for youth of earlier familial influences with respect to health care, health attitudes and child-rearing practices. In addition, the relationship of the structure of society to the growth and development of children and youth is considered.

Admission is subject to approval of the instructor.

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DEPARTMENT OF MICROBIOLOGY

- JOHN C. SNYDER, A.B., M.D., LL.D., *Henry Pickering Walcott Professor of Public Health and Head of the Department*
- GEOFFREY EDSALL, M.D., *Professor of Applied Microbiology and Superintendent of Institute of Laboratories, Department of Public Health of Massachusetts*
- EDWARD S. MURRAY, A.B., M.D., M.P.H., *Associate Professor of Microbiology and Assistant Physician to University Health Services*
- SAMUEL D. BELL, JR., A.B., M.D., M.P.H., *Associate Professor of Microbiology and Assistant Physician to University Health Services*
- ROBERT S. CHANG, B.SC., M.D., S.D. IN HYG., *Associate Professor of Microbiology*
- CHARLOTTE C. CAMPBELL, S.B., *Associate Professor of Medical Mycology*
- HERBERT L. LEY, JR., M.D., M.P.H., *Associate Professor of Epidemiology and Microbiology*
- ROBERT A. MACCREADY, S.B., M.D., *Lecturer on Applied Microbiology and Director of Diagnostic Laboratories, Department of Public Health of Massachusetts*
- ROGER L. NICHOLS, A.B., M.D., *Assistant Professor of Applied Microbiology*
(Absent 1965-66)
- J. WILLIAM VINSON, S.B., S.D. IN HYG., *Research Associate in Microbiology*
- ROBERT B. PENNELL, S.B., S.M., PH.D., *Lecturer on Immunology*
- HERALD R. COX, A.B., S.D., S.D. (hon.), *Visiting Lecturer on Microbiology*
- CHARLES H. RAMMELKAMP, A.B., M.D., S.D. (hon.), *Visiting Lecturer on Microbiology*
- KENNETH F. GIRARD, S.B., M.SC., PH.D., *Research Associate in Microbiology*
- MARIA EBE RECA, DR.CHEM., *Research Associate in Medical Mycology*
- JOHN H. PETERS, S.B., M.D., *Research Associate in Microbiology*
- DOROTHY E. MCCOMB, S.B., *Assistant in Microbiology*
- JANE D. O'CONNOR, S.B., *Assistant in Microbiology*
- LEO LEVINE, S.B., *Assistant in Microbiology*
- GRACE C. YUAN, B.S., M.D., *Assistant in Microbiology*
- JUDITH M. SPIELMAN, S.B., S.M.HYG., *Assistant in Microbiology*
- I-HUNG PAN, DR.MED.SCI., *Research Fellow in Microbiology*
- HARRY J. ASHE, A.B., M.D., M.P.H., *Research Fellow in Microbiology*

The Department of Microbiology is concerned with the bacteria, rickettsiae, and viruses which cause the principal communicable diseases of public health importance. The staff members have many interests in common with the

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Departments of Epidemiology and Tropical Public Health. The courses in microbiology are intended primarily for students with a background in the medical and biological sciences.

The basic course, Microbiology-Tropical Public Health 1 a,b,c is designed to provide the students in the Master of Public Health program with the factual information and the principles of microbiology and parasitology which are essential to a general understanding of the field of public health.

The advanced courses of the Department are planned for students whose major interests lie in some aspect of the communicable diseases. The titles and descriptions as listed below indicate the scope of the instruction offered by the Department.

Students who are interested in learning research technics and in undertaking original investigation may register for Microbiology 17 during their first year, or Microbiology 20 after they have acquired technical skill in handling pathogenic microorganisms. These two courses provide the opportunity to work in close association with a member of the staff on research problems in specific areas as listed under Course 20 below. Present Departmental interests include the rickettsiae and certain viruses; the biological aspects of host-parasite relations, and the properties of human cells in tissue culture; and immunological problems, including statistical and field assay technics. Entomological problems of certain types are also within the scope of the research interests and facilities of the Department.

A program supported by the National Institutes of Health is available to assist qualified applicants who desire training in infectious disease, including rickettsial, viral, bacterial and mycological infections.

Candidates for the Master of Public Health degree who elect to concentrate in Microbiology are normally expected to take the following courses in addition to satisfying the formal course requirements for the degree:

Microbiology and Tropical Health 1a,b,c

Microbiology 2d

Microbiology 15a,b,c,d

Microbiology and Tropical Public Health 1a,b,c. Ecology and Epidemiology of Infectious Diseases

Lectures, seminars, conferences and laboratory exercises. *Tuesdays, 10:30-11:30, Wednesdays, 9:30-10:30, Thursdays, 11:30-12:30 and 1:30-4:30, first period; Tuesdays and Thursdays, 10:30-11:30, Wednesdays, 9:30-10:30, Thursdays, 1:30-4:30, second period; Mondays, Wednesdays and Fridays, 9:30-10:30, Tuesdays and Thursdays, 10:30-11:30, third period.* Dr. WELLER, Dr. LEY and the Staff of the two Departments.

Credit 6 units.

One of the six semi-elective courses from which Master of Public Health candidates are required to elect a minimum of 12.5 credit units.

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This course is under the general direction of Drs. Weller and Ley, with the collaboration of the staff of the Departments of Microbiology, Tropical Public Health and Epidemiology. The purpose of the course is to provide students in the Master of Public Health program with the basic knowledge of the communicable and infectious diseases, including the relevant ecologic factors which pertain directly to their prevention and control.

Microbiology and Tropical Public Health 1 a,b,c is designed for students who have had most of the courses given in the first two years of medical school or their equivalent. The exercises include discussions of the present status of infectious diseases in tropical and temperate climates and the technics available for study of microorganisms and parasites, with special reference to recent methods which have opened a new era in microbiology. The course emphasizes the principal diseases of public health importance. The subjects are presented by etiologic agent, including protozoa, helminths, viruses, rickettsiae, spirochetes and bacteria.

Approximately two-thirds of the time will be devoted to lectures and one-third to conferences, seminar discussions, and laboratory exercises. In the laboratory the student is expected to acquire an understanding of the potentialities as well as the limitations of pertinent public health laboratory procedures.

Microbiology 2d. Current Research in Microbiology

Tuesdays, 8:30:10-30, fourth period. Dr. SNYDER and members of the Staff.
Credit 1 unit.

This course is arranged for the students who are concentrating in microbiology, epidemiology or tropical public health. Important papers from current periodicals on topics of general interest are assigned to the students for presentation. These papers are reviewed critically in respect to evaluation of the experimental work, analysis of the results, organization of the manuscripts, and clarity of presentation.

The purpose of the course is to develop the ability of the students to read the literature analytically and to plan their own work and manuscripts effectively.

Epidemiology and Microbiology 5d. Epidemiologic Problems in Infectious Disease

Conferences, seminars, laboratory exercises. *Mondays and Wednesdays, 10:30-12:30, fourth period.* Dr. LEY and associates.

Credit 2 units.

A course given by the staffs of the Departments of Microbiology, Epidemiology and Tropical Public Health providing experience in solving epidemiologic problems in communicable disease.

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Microbiology 11c. Public Health Laboratory Procedures

Lectures, seminars, and laboratory exercises. *Mondays and Fridays, 1:30-4:30, Wednesdays, 3:30-4:30, third period.* Dr. MURRAY, Miss CAMPBELL, Dr. LEY and Dr. MACCREADY.

Credit 2 units.

This course provides the opportunity to become familiar with the technics in use by public health laboratories for the diagnosis of the common bacterial and viral diseases. Some of the exercises are devoted to methods recently developed for the study of various microorganisms. The exercises are designed for orientation of the epidemiologist as well as the microbiologist, with particular reference to the potentialities and limitations of laboratory technics in the conduct of field investigations of communicable diseases.

Short exercises illustrate the important principles of tests in serology and bacteriology, and the students themselves inoculate embryonated eggs and animals by various routes, prepare diagnostic antigens, and perform neutralization tests and red cell agglutination tests.

Limited to fourteen students who are enrolled in Microbiology-Tropical Public Health 1 a,b,c.

Microbiology 12c. Applied Immunology: Biological Products in Public Health

Seminars and laboratory demonstrations at the Institute of Laboratories of the Massachusetts Department of Public Health. Time to be arranged, third period. Dr. EDSALL and Staff of the Institute of Laboratories.

Credit 1 unit.

This course deals with the immunological principles underlying the preparation, evaluation and use of serums, vaccines and other biologic products used in public health practice. The design and interpretation of laboratory and field tests of biologic products, the estimation of their safety and effectiveness, and related questions will be discussed. Each participant will present an oral and written report on a specific problem of current importance.

Opportunities are offered properly qualified students for original work at the Institute in problems of public health immunology with credit for Microbiology 17 or 20 to be arranged with the Head of the Department.

Microbiology 13d. Rickettsial and Viral Diseases of Public Health Importance

Lectures, laboratory exercises, and seminars. *Mondays and Fridays, 1:30-4:30, Wednesdays, 3:30-4:30, fourth period,* and three hours per week individual laboratory work. Dr. CHANG, Dr. BELL, Dr. MURRAY and Dr. LEY.

Credit 3 units.

The purpose of this course is to teach the basic principles and technics for laboratory study of certain rickettsiae and viruses which are of interest to public health workers. The course consists of lectures, seminars, supervised

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individual work, and laboratory exercises. The latter include methods for identification of representative species of rickettsiae and viruses of public health importance by the use of tissue culture, animal inoculation, and serologic technics.

The arthropods which are vectors or reservoirs of the major viral and rickettsial diseases are briefly considered at appropriate points in the exercises.

The course is planned as a basic preparation for those who will be involved in original research on rickettsiae or viruses either in the laboratory or the field.

Limited to ten students who have completed Microbiology 11C or who have had equivalent previous preparation.

Microbiology 15a,b,c,d. Seminars in Microbiology

Seminars. *Wednesdays, 1:30-3:30, all four periods.*

Credit 1 unit in each period.

Seminars on topics of special interest in microbiology. These vary from presentations by students of subjects assigned for analysis and review to reports by staff members and advanced students of research work in progress in the Department.

Microbiology 17a,b,c,d,e. Introduction to Research

Time and credit to be arranged with the Department Staff.

Students without previous experience in research may register for supervised laboratory work in one of the areas listed under Course 20 below.

Microbiology 20a,b,c,d. Research

Doctoral candidates or full-time special students who have completed the advanced courses in microbiology in the Department may undertake original investigation by arrangement with the Head of the Department.

There are six general areas currently under investigation by members of the Department:

(a) Serological problems as studied by technics of fluorescent antibody, complement fixation, and immunoelectrophoresis (Dr. MURRAY and Dr. NICHOLS).

(b) Biologic studies of rickettsiae and the psittacosis-lymphogranuloma-trachoma viruses (Dr. MURRAY, Dr. BELL, Dr. LEY and Dr. VINSON).

(c) Virology and cell biology (Dr. CHANG).

(d) Experimental infection of laboratory-reared lice and fleas (Dr. MURRAY and Dr. VINSON).

(e) Antigenic analysis of systemic pathogenic mycotic agents; ecologic and epidemiologic problems associated with systemic mycotic diseases and agents; microenvironmental studies on the systemic pathogenic fungi (Miss CAMPBELL).

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(f) At the Institute of Laboratories, Massachusetts Department of Public Health, students may participate in studies related to the development, preparation, testing, characterization and evaluation of biologic products, on the diagnosis of infectious disease, or the characteristics of infectious agents or on related aspects of epidemiology, microbiology and immunology (Dr. EDSALL and Dr. LEY).

Microbiology and Tropical Public Health 40c. Tuberculosis

Conferences, seminars and demonstrations. *Wednesdays, 10:30-12:30, third period.* Dr. KOCH-WESER and Miss CAMPBELL.

Credit 1 unit.

The purpose of this course is to provide an understanding of the ecology and the public health significance of tuberculosis which continues to be a world wide problem of major importance. Various features of tuberculosis are presented, particularly the microbiologic, medical, social, and economic aspects.

Demonstrations of pertinent material will be given by the instructors and invited specialists, and previously assigned literature will be discussed. The course will also consider the significance of diseases often confused with tuberculosis, especially the mycoses.

Microbiology and Tropical Public Health 41d. Medical Mycology

Laboratory, conferences and field exercises. *Two afternoon sessions, three hours each, time to be arranged, fourth period.* Miss CAMPBELL and associates.

Credit 2 units.

This course is designed to provide the student with the principles and technics essential to the study of pathogenic fungi of medical and public health importance. The course consists of conferences, lectures and laboratory and field work under tutorial supervision. Emphasis is placed on the isolation of mycotic agents from cases in humans and sources in nature by *in vitro* and *in vivo* cultivation, and on identification by morphologic, biochemical and histologic characteristics. Procedures for soil baiting, soil sampling, skin and serologic tests, as adjuncts in establishing indirect or presumptive diagnosis and in defining geographic distribution and areas of high endemicity, are integral aspects of the course.

The course is designed to prepare graduates for laboratory research or field studies in the area of medical mycology. Enrollment, subject to the approval of the instructor.

HARVARD UNIVERSITY

DEPARTMENT OF NUTRITION

- FREDRICK J. STARE, S.B., S.M., PH.D., M.D., A.M. (hon.), S.D. (hon.), *Professor of Nutrition and Head of the Department*
- D. MARK HEGSTED, S.B., S.M., PH.D., A.M. (hon.), *Professor of Nutrition*
- JEAN MAYER, B.A., B.SC., M.SC., PH.D., D.SC., *Professor of Nutrition and Lecturer on the History of Public Health*
- ROBERT P. GEYER, S.B., S.M., PH.D., *Associate Professor of Nutrition*
- STANLEY N. GERSHOFF, A.B., S.M., PH.D., *Associate Professor of Nutrition*
- STEPHEN B. ANDRUS, S.B., M.D., *Assistant Professor of Pathology* (Absent 1965-66)
- JOSEPH J. VITALE, S.B., S.M., S.D. IN HYG., *Assistant Professor of Nutrition*
- BERNARD LOWN, S.B., M.D., *Assistant Professor of Medicine*
- ROBERT B. MCGANDY, A.B., M.D., M.P.H., *Assistant Professor of Nutrition*
- CARL C. SELTZER, A.B., PH.D., *Research Associate in Physical Anthropology*
- HECTOR A. CASTELLANOS, S.B., B.MED., M.D., *Research Associate in Nutrition*
- MADGE L. MYERS, A.B., S.M., *Instructor in Nutrition*
- PATRICIA A. STEFANIK, S.B., S.M., *Instructor in Nutrition*
- EDWIN L. PRIEN, A.B., A.M., M.D., *Clinical Research Associate in Nutrition*
- HERNAN VELEZ, M.D., *Clinical Research Associate in Nutrition*
- F. RUSSELL OLSEN, A.B., *Research Associate in Nutrition*
- MARIA BANASIEWICZ, M.D., M.P.H., *Research Associate in Nutrition* (Absent to December 31, 1965)
- OSCAR M. JANKELSON, M.D., *Research Associate in Medicine*
- AGNES M. HUBER, B.SC., PH.D., *Research Associate in Nutrition*
- JOSEPH M. MILLER, A.B., M.D., M.P.H., *Research Associate in Medicine*
- HEDWIG ELIZABETH ROSE, M.B., CH.B., *Research Associate in Pediatrics*
- WILLIAM B. HOOD, JR., S.B., M.D., *Research Associate in Medicine*
- ETHEL J. BOWIE, S.B., *Assistant in Nutrition*
- DOROTHY BRUNO, S.B., *Assistant in Nutrition*
- SHEILA N. CRONIN, S.B., S.M., *Assistant in Nutrition*
- MICHAEL C. LATHAM, B.A., M.D., D.T.M.&H., M.P.H., *Research Fellow in Nutrition*
- MICHAEL A. ROSSI, S.B., M.D., *Research Fellow in Nutrition*
- HIKARU KOIDE, M.D., *Research Fellow in Nutrition*
- CHARLES E. ELSON, S.B., S.M., PH.D., *Research Fellow in Nutrition*
- CLIFTON A. BAILE, S.B., PH.D., *Research Fellow in Nutrition*
- JEANNETTE H. FORSYTH, A.B., PH.D., *Research Fellow in Nutrition*

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ALI MOHAMMED FAKHRO, M.D., *Research Fellow in Nutrition*

GUY J. ROBERGE, A.B., M.D., *Research Fellow in Nutrition*

BRIAN MCCARTHY, B.AGR.SC., M.AGR.SC., PH.D., *Research Fellow in Nutrition*

JAMES H. SHAW, B.A., S.M., PH.D., A.M. (hon.), *Associate Professor of Biological Chemistry in the School of Dental Medicine*

IRA GORE, A.B., M.D., *Lecturer on Pathology*

NORMAN ZAMCHECK, A.B., M.D., *Clinical Associate in Medicine*

EARL E. HELLERSTEIN, A.B., M.D., *Assistant Professor of Pathology*

DANIEL S. BERNSTEIN, A.B., M.D., *Associate in Medicine*

CHARLES D. GURI, S.B., M.D., *Research Fellow in Medicine*

The Department of Nutrition is concerned with basic and applied investigations in the science of nutrition in the areas of biochemistry, physiology, and pathology. Many of these are oriented toward problems of contemporary public health importance, such as cardiovascular disease, obesity, and cancer. The Department also has programs dealing with general nutritional and health problems in various countries in South America, Africa, and Asia.

In addition to the courses available in the School of Public Health, students may take graduate courses in the other Schools of Harvard University and at the Massachusetts Institute of Technology. Thus, a program leading to the Doctor of Science degree might include courses in nutrition, biochemistry, biostatistics and epidemiology, physiology, and bacteriology, as well as advanced courses in these and related fields, such as organic and physical chemistry and biology. Appropriate programs are available for individuals whose interests lie in community nutrition rather than in laboratory nutrition and biochemistry.

Candidates for the Master of Public Health degree who elect to concentrate in Nutrition are normally expected to take the following courses in addition to satisfying the formal course requirements for the degree:

Nutrition 1a,b and at least one other course offered by the Department of Nutrition.

Nutrition 1a,b. Public Health Nutrition

Lectures. *Wednesdays, 10:30-12:30, first and second periods; Fridays, 11:30-12:30, first period.* Dr. STARE and Staff of the Department.

Credit 2.5 units.

One of the six semi-elective courses from which Master of Public Health candidates are required to elect a minimum of 12.5 credit units.

This course deals with the science of nutrition and its application to problems of human nutrition. Approximately one half of the lectures are devoted to basic and clinical nutrition. Dietary requirements are considered in rela-

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tion to growth, development, pregnancy, lactation and disease states. Methods for establishing and meeting nutrition requirements, especially in countries with unfavorable economic conditions, are discussed. The etiology, treatment and prevention of diseases related to nutritional factors are considered. Content also includes nutrition surveys and their evaluation, the place of the nutritionist in the public health program, and the nutritional problems of relief, rehabilitation, famine and other emergencies. The relation of production, distribution and preparation for the best use of foods is discussed, as are the problems of food enrichment, fortification and faddism.

Seminar sessions are arranged for small groups. Active student participation is expected.

Nutrition 2c,d. Advanced Topics in Nutrition

Lectures, discussions and required reading. *Wednesdays, 1:30-3:30, third and fourth periods; Fridays, 8:30-10:30, fourth period.* Dr. HEGSTED, Dr. MAYER and Dr. GERSHOFF.

Credit 3 units.

The chemistry, function and metabolism of carbohydrates, fats, proteins, vitamins and essential minerals are considered in detail. Mechanisms of regulation and behavioral aspects of food and fluid intake, calorimetry, genetic factors in nutrition, comparative requirements of various species are examined.

This course is intended primarily for students majoring in nutrition but can be taken by other adequately prepared students by consent of the instructors.

Nutrition 3c,d. Laboratory Technics

Lectures and demonstrations. *Wednesdays, 3:30-5:30, third and fourth periods.* Dr. GEYER and Dr. VITALE.

Credit 2 units. Additional credits can be arranged for those desiring extra laboratory instruction.

This course is a survey of methods pertinent to laboratory research. The material covered includes biophysical and chemical technics. Students participate in the preparation and presentation of such general topics as chromatography, spectroscopy, microbiological assay, manometric measurements, and purified diet technics. They are then instructed in the actual laboratory procedure pertaining to these technics.

Prerequisites: A basic course in biochemistry and consent of instructor.

Nutrition 5d. Nutritional Surveys

Lectures, discussions and laboratory exercises. Two hours a week, time to be arranged, fourth period. Dr. GERSHOFF and Dr. MCGANDY.

Credit 1 unit.

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Methods of obtaining dietary information, principle of nutritional surveys; assessment of nutritional status in public health programs and clinical research are examined and discussed. Laboratory work will consist of practical exercises in evaluating diets and surveys.

Nutrition 17a,b,c,d,e. Tutorial Program

Time and credit to be arranged.

Individual work, under direction, may be arranged for students at the master's level. This may include laboratory studies or projects in applied nutrition.

Nutrition 20. Research

Time and credit to be arranged.

Facilities are available for students at the doctoral level to do advanced work in nutrition along the lines of fundamental research or applied nutrition in public health and medicine.

Admission limited and subject to approval of the instructor.

Nutrition 40c,d. Nutritional Aspects of Human Disease

Lectures, discussions and demonstrations. *Thursdays, 3:30-5:30, third and fourth periods.* Dr. STARE and Staff of the Department.

Credit 2 units.

This course considers in detail the application of current nutritional knowledge to areas of clinical medicine where nutritional deficiency or dietary management are of major importance. The assessment of nutritional status, the diagnosis and management of common deficiency diseases, and the role of nutrition in the etiology and treatment of the chronic and degenerative diseases are discussed.

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DEPARTMENT OF PUBLIC HEALTH PRACTICE

RICHARD H. DAGGY, S.B., S.M., PH.D., M.P.H., DR.P.H., *Acting Head of the Department and Assistant Dean of the Faculty of Public Health for International Programs*

ALFRED L. FRECHETTE, M.D., M.P.H., *Clinical Professor of Public Health Practice and Commissioner of Public Health, Commonwealth of Massachusetts*

SOL LEVINE, A.B., A.M., PH.D., *Associate Professor of Social Psychology*

ELIZABETH P. RICE, A.B., S.M., *Associate Professor of Public Health Social Work*

MARJORIE A. C. YOUNG, S.B., ED.M., M.P.H., DR.P.H., *Associate Professor of Health Education*

SYDNEY H. CROOG, A.B., A.M., PH.D., *Assistant Professor of Sociology*

LENIN A. BALER, A.B., A.M., PH.D., S.M. IN HYG., S.D. IN HYG., *Assistant Professor of Psychology*

ROY PENCHANSKY, S.B., M.I.L.R., D.B.A., *Assistant Professor of Administration in Medical Care*

NORMAN A. SCOTCH, A.B., A.M., PH.D., S.M. IN HYG., *Assistant Professor of Social Anthropology*

DAVID L. RABIN, A.B., M.D., M.P.H., *Assistant Professor of Public Health*

JAMES E. TEELE, A.B., A.M., PH.D., *Assistant Professor of Sociology*

WILLIAM L. CLAFF, A.B., M.B.A., *Lecturer on Administration*

HARRY T. PHILLIPS, M.B., CH.B., D.P.H., M.D., *Lecturer on Public Health Practice*

EDWARD B. KOVAR, A.B., A.M., *Lecturer on Public Health Practice*

ARTHUR R. JACOBS, A.B., M.D., M.P.H., *Instructor in Public Health*

BERYL M. SAFFORD, A.B., *Assistant in Public Health Practice*

AARON G. ANTONOVSKY, A.B., A.M., PH.D., *Senior Research Fellow in Sociology*

OSLER L. PETERSON, M.B., M.D., M.P.H., *Visiting Professor of Preventive Medicine, Member of the Faculty of Public Administration*

JAMES M. DUNNING, A.B., D.D.S., M.P.H., *Professor and Head, Department of Ecological Dentistry, Harvard School of Dental Medicine and Director, Dental Health Service, University Health Services*

WILLIAM J. CURRAN, LL.B., LL.M., S.M. IN HYG., *Lecturer on Legal Medicine, Harvard Law School, (Utley Professor of Legal Medicine, Director, Law-Medicine Research Institute, Boston University)*

GERALD D. ROSENTHAL, A.B., S.M., PH.D., *Assistant Professor of Economics*

SIDNEY S. LEE, S.B., M.D., M.P.H., DR.P.H., *Lecturer on Preventive Medicine, Harvard Medical School and General Director, Beth Israel Hospital*

RALPH E. BERRY, JR., A.B., A.M., *Teaching Fellow in Economics*

One of mankind's greatest challenges is to make available to world society its immense technological knowledge. Unless man has institutions and tech-

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niques through which scientific knowledge can be applied to society's benefit, the knowledge itself is limited in its effect. The role of the Department of Public Health Practice is to add to our understanding of and to strengthen these institutions and techniques and to train the policy-makers and administrators who will serve the field of public health throughout the world.

Public health administration is a multidisciplinary art and science. As such, it requires contributions from a wide variety of disciplines, including medicine and other health sciences, business administration, economics, political science, and the behavioral sciences. The training and research programs of the Department of Public Health Practice therefore utilize extensively other resources of Harvard University such as the Schools of Medicine, Public Administration, Business Administration, and Education and the Departments of Economics, Government, and Social Relations.

The courses of the Department are designed to train three broad groups of personnel: generalist administrators in public health, administrators of special health programs, and technical specialists who may have some administrative responsibilities in their careers. The objective is to provide these people with an understanding of organizational and administrative concepts and research methods which are applicable to a wide variety of public health programs.

The research program of the Department is broad and currently deals with studies ranging from quality of medical care to the analysis of administrative processes and controls in health organizations. These studies provide opportunities for both master's degree and doctoral degree candidates to increase their familiarity with research methodology. Fellowship support is available for qualified doctoral candidates.

The Department is involved in a number of service activities with local, state, national, and international organizations which provide opportunities for field experience for students concentrating in the Department. For students entering the School with limited prior public health experience, the Department can arrange field assignments in health agencies during the summer months preceding the commencement of course work. Field assignments for students are also arranged and supervised by the staff of the Department during and following the academic year.

Through its training, research, and service activities the Department seeks to provide a better understanding of sociocultural factors in health and disease and in the administrative process, more insight into methods of influencing the quality and quantity of medical care available to people throughout the world, greater comprehension of the process of economic development and the particular role played by investments in health programs, and an increased understanding of the influence of organizational and administrative structure on health programs.

Candidates for the Master of Public Health degree who elect to concentrate

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in Public Health Practice are normally expected to take the following courses in addition to satisfying the formal course requirements for the degree:

Public Health Practice 15a,b,c,d

Public Health Practice 2c,d

Public Health Practice 1a,b. Organization and Administration of Health Services I

Lectures and discussion. *Mondays, 10:30–12:30, and Fridays, 10:30–11:30, first period; Mondays and Fridays, 10:30–12:30, second period.* Staff of the Department.

Credit 3 units.

Required of Master of Public Health candidates.

The course is concerned with basic concepts essential to the planning, organization, and administration of government and private health programs.

Among the subjects discussed are legal, sociocultural, and economic factors affecting the provision of health and medical care services, internal management of health agencies, characteristics of health agency interrelationships, health manpower requirements, and planning for medical care services.

Public Health Practice 2c,d. Organization and Administration of Health Services II

Seminars. *Mondays and Fridays, 1:30–3:30, third and fourth periods.* Staff of the Department.

Credit 4 units.

An advanced course for students whose future careers will involve significant management responsibilities for health programs.

The course analyzes a number of areas which are important to policy-makers and administrators, including the planning and decision-making process, preparation of program plans and budgets, designing organizational structures, techniques for program supervision and control, management of personnel and financial resources, and research in administration. Case studies and exercises are used to focus discussion on the practice environment.

Public Health Practice 3a,b. Economics and Administration of Medical Care

Seminars. *Tuesdays, 2–4, first and second periods.* Dr. PENCHANSKY, Dr. ROSENTHAL, Dr. PETERSON, Professor DUNLOP, and Dr. HAMLIN.

Credit 2 units.

An interdisciplinary course which surveys major issues in the economics and administration of medical care programs.

The course is designed for graduate students from the Schools of Public Health, Medicine, Business Administration, and Public Administration, and the Department of Economics. Seminars are conducted by the Interfaculty

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Committee on Health and Medical Care composed of representatives from the participating schools. The course is held at the Littauer Center for Public Administration.

The seminar deals with relationships among resources, organizational structure, methods of payment, and the need and demand for medical care. It explores such major issues as the character of illness and patients, the organization of medical education and medical practice, changing requirements for health manpower and health facilities, patterns of organization of personal health services, quantitative and qualitative standards for medical care, government and private policies on providing and financing personal health services, and factors influencing utilization, efficiency, and cost of various components of medical care, both in the United States and in other countries.

Special reading materials on medical care, selected and prepared by the seminar staff, serve as the basis for seminar discussion and analysis.

The course is also listed as Economics 285.

Public Health Practice 4c,d. Case Study Analysis of Economic and Administrative Problems in Medical Care

Seminars. *Tuesdays, 3:30–5:30, third and fourth periods.* Dr. PENCHANSKY, Dr. LEE, Dr. ROSENTHAL, Dr. PETERSON, Professor DUNLOP, and Dr. HAMLIN.

Credit 2 units.

An advanced interdisciplinary course which emphasizes analysis, planning, and decision-making in medical care programs through the use of case studies and supplemental materials.

The course is designed for graduate students from the Schools of Public Health, Medicine, Business Administration, and Public Administration, and the Department of Economics. Members of the Interfaculty Committee on Health and Medical Care, composed of representatives from the cooperating schools, participate in the seminars. The course is held at the School of Public Health.

The case studies concern selected government health programs in the United States and other countries, proposals to finance health care for the aged, methods to control cost and utilization of personal health services, organizational and manpower problems in medical care programs, management of union health and welfare programs, and the structure and quality of medical practice.

Special arrangements permit students to take both this seminar and Bio-statistics 2c,d. The course is also listed as Economics 285.

Public Health Practice 5c,d. Health Education

Seminars. *Thursdays, 2:30–4:30, third and fourth periods.* Dr. YOUNG and associates.

Credit 2 units.

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This seminar emphasizes major aspects of learning theory, communication theory, educational methods, types of health behavior, health education in the process of social change, psychosocial and cultural factors relevant to the planning of health education programs, and research and evaluation in health education. Major focus in the seminar is on health education aspects of community health programs, including school health services.

Public Health Practice 6d. Legal Problems of Organized Health Programs

Seminars. *Mondays, 10:30-12:30, fourth period.* Professor CURRAN.

Credit 1 unit.

This course is designed for students who are particularly interested in legal aspects of health programs.

Seminars include discussions of constitutional problems in public health programs, the legislative process, professional and legal standards for the health professions and in research, general considerations of administrative law, regulation-making by health organizations, legal reforms in personal injury litigation, and the presentation of expert medical testimony.

Public Health Practice 7b. The Development of Personality in Health and Disease

Seminars. *Fridays, 3:30-5:30, second period.* Dr. BALER.

Credit 1 unit.

This course discusses concepts and data of particular relevance to public health workers for increasing their understanding of factors influencing healthy and unhealthy personality development. Its primary purpose is to clarify the need for community mental health programs and to suggest areas for research.

Seminars include discussion of genetic, prenatal, and postnatal factors, the role of parent-child relationships, and the sociocultural influences of the community on personality development. Special topics, such as juvenile delinquency and mental retardation, are presented as student reports.

Public Health Practice 8c,d. Health and Illness in Cross-Cultural Perspective

Seminars. *Mondays, 3:30-5:30, third and fourth periods.* Dr. LEVINE, Dr. SCOTCH and associates.

Credit 2 units.

This course is designed for public health students who seek greater familiarity with social and cultural aspects of health and illness in this and other countries, and for social science students interested in health and health services as a research area. Much of the course consists of presentations by experts conducting specific studies of a sociomedical nature, followed by informal class discussion. Admission is limited to twelve students and requires consent of the instructor.

This course is also listed as Social Relations 283.

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Public Health Practice 15a,b,c,d. Departmental Seminar

Seminars. *Wednesdays, 1:30-3:30, in all four periods.* Staff of the Department.

Credit 4 units.

The course is for students with a major interest in the organization and administration of health programs. It is concerned with the planning and operation of health programs and institutions.

In the fall term, various methodologies for planning and actual planning approaches in several program areas, such as mental health and chronic diseases, are analyzed in depth. In the spring term, the emphasis is on the organization, administration, and operation of various medical programs and institutions, such as hospital ambulatory and inpatient services and intermediate and long-term care facilities.

Public Health Practice 17a,b,c,d,e. Tutorial Program

Time and credit to be arranged.

Master's degree candidates may make arrangements to do individual and group work under the guidance of a staff member of the Department.

This work can include readings and special projects in such areas as dental health and medical care. In addition, field assignments to federal, state and local government and private health organizations can be arranged during the field work period from January 31 to February 5, 1966.

Public Health Practice 20. Research

Doctoral candidates are offered the opportunity to undertake individual study and research as the basis for a doctoral thesis.

Public Health Practice 41c,d. Health and Economic Development

Lectures and Discussion. *Wednesdays, 10:30-12:30, third and fourth periods.* Dr. PENCHANSKY and Mr. BERRY.

Credit 2 units.

An interdisciplinary course focusing on the issues of economic development and health planning designed for students who have particular interest in the less developed nations.

The course is intended to provide the student with an introduction to economic analysis, the process of economic development, and the interrelationship of health and economic development. Topics to be considered include theories of economic development, economic planning, economic development in historical perspective, the current planning problems of less developed countries, and the significance of health, human capital, and population to economic development. Problems of health planning in underdeveloped countries and approaches to the integration of health planning and economic planning will be discussed.

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DEPARTMENT OF TROPICAL PUBLIC HEALTH

- THOMAS H. WELLER, A.B., S.M., M.D., LL.D., *Richard Pearson Strong Professor of Tropical Public Health, Director of the Center for the Prevention of Infectious Diseases, and Head of the Department*
- FRANKLIN A. NEVA, S.B., M.D., A.M. (hon.), *John La Porte Given Professor of Tropical Public Health*
- ROBERT B. WATSON, S.B., M.D., M.P.H., *Visiting Professor of Tropical Health*
- ELI CHERNIN, S.B., A.M., S.D., *Associate Professor of Tropical Public Health*
- CHARLOTTE C. CAMPBELL, S.B., *Associate Professor of Medical Mycology*
- DIETER KOCH-WESER, M.D., S.M., PH.D., *Associate Professor of Tropical Health and Human Ecology, and Assistant to the Dean for Latin American Programs*
- THOMAS E. FROTHINGHAM, M.D., *Associate Professor of Tropical Public Health*
- RICHARD H. DAGGY, S.B., S.M., PH.D., M.P.H., DR.P.H., *Lecturer on Tropical Public Health, and Assistant Dean for International Programs*
- STEVE C. PAN, B.SC., M.D., M.P.H., *Assistant Professor of Tropical Public Health*
- EDWARD H. MICHELSON, S.B., S.M., PH.D., *Assistant Professor of Tropical Public Health*
- ANDREW SPIELMAN, S.B., S.D., *Associate in Tropical Public Health*
- PAUL F. RUSSELL, A.B., M.D., M.P.H., S.D. (hon.), *Visiting Lecturer on Tropical Public Health*
- FRED L. SOPER, A.B., S.M., M.D., DR.P.H., S.D. (hon.), *Visiting Lecturer on Tropical Public Health*
- SAMUEL W. SIMMONS, S.B., A.M., PH.D., *Visiting Lecturer on Tropical Public Health*
- G. ROBERT COATNEY, A.B., A.M., PH.D., S.D. (hon.), *Visiting Lecturer on Tropical Public Health*
- HARRY MOST, S.B., M.D., D.T.M.&H., D.M.S., *Visiting Lecturer on Tropical Public Health*
- SAMUEL B. KIRKWOOD, A.B., M.D., *Visiting Lecturer on International Health*
- ROBERT J. TONN, S.B., S.M., PH.D., M.P.H., *Instructor in Tropical Public Health*
- CATHERINE C. SEARS, A.B., M.D., M.P.H., *Instructor in Tropical Health*
- ALBERT E. WEYER, A.B., A.M., *Research Associate in Tropical Health*
- PETER BRAUN, S.B., M.D., *Research Fellow in Tropical Public Health*
- ROBERT J. M. WILSON, B.SC., PH.D., *Research Fellow in Tropical Public Health*

GUSTAVE J. DAMMIN, A.B., M.D., A.M. (hon.), *Elsie T. Friedman Professor of Pathology*

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FRANZ C. VON LICHTENBERG, M.D., DR. (hon.), *Assistant Professor of Pathology at the Peter Bent Brigham Hospital*

The health problems of the tropical regions are, for the most part, those of the poorly sanitated areas of the world at large. In such areas the communicable and nutritional diseases are of primary import. The teaching and research interests of the Department of Tropical Public Health deal with the former category—the communicable diseases. Emphasis is placed on important infectious disease entities common to all climates and on those which are ecologically restricted to the tropics. In the presentation of factual material, equal emphasis is given to ecological and epidemiological factors, to new knowledge concerning pathogenesis and diagnosis, and to prevention and control.

The basic course, Microbiology-Tropical Public Health 1a,b,c is designed to provide the Master of Public Health candidate with an integrated presentation of information on communicable diseases of major public health importance. Tropical Public Health 2a,b is designed for the Master of Public Health candidate concentrating in the field of Tropical Public Health. Attention is directed to Tropical Public Health 3d, open to all students, which deals with environmental and cultural factors influencing the development of health programs in tropical areas. With the exception of Tropical Public Health 3d, admission to the basic courses is contingent upon an adequate background in the pre-clinical medical sciences, especially pathology.

The investigative program in the Department is broad and currently deals with pathogens ranging from viruses to helminths. Thus, studies on the *in vitro* cultivation and the physiology and immunology of a wide variety of agents are in progress. Biological investigations on the molluscan vectors of the schistosomes comprise another area of major interest. Facilities are available for the training of a limited number of students at the Doctor of Public Health or Doctor of Science in Hygiene level, who may wish to spend a minimum of two years with emphasis on a program of original research. Due to time limitations, the Doctor of Science in Hygiene applicant should, in so far as possible, obtain the necessary medical science background prior to enrollment.

A program supported by the National Institutes of Health is available to assist qualified applicants who desire training in medical parasitology (see page 108) and a similar program is available to provide training in tropical medicine. Collaborative arrangements established with institutions in the tropics provide diversified opportunities for study and research overseas.

Candidates for the Master of Public Health degree who elect to concentrate in Tropical Public Health are normally expected to take the following courses in addition to satisfying the formal course requirements for the degree:

Tropical Public Health 1a,b,c

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Tropical Public Health 2a,b

Tropical Public Health 3d

Tropical Public Health 5c,d

On the basis of past experience almost all students concentrating in the Department have also taken Tropical Public Health 7c and Tropical Public Health 10c.

Microbiology and Tropical Public Health 1a,b,c. Ecology and Epidemiology of Infectious Diseases

Lectures, seminars, conferences and laboratory exercises. *Tuesdays, 10:30-11:30, Wednesdays, 9:30-10:30, Thursdays, 11:30-12:30 and 1:30-4:30, first period; Tuesdays and Thursdays, 10:30-11:30, Wednesdays, 9:30-10:30, Thursdays, 1:30-4:30, second period; Mondays, Wednesdays and Fridays, 9:30-10:30, Tuesdays and Thursdays, 10:30-11:30, third period.* Dr. WELLER, Dr. LEY and Staff of the two Departments.

Credit 6 units.

One of the six semi-elective courses from which Master of Public Health candidates are required to elect a minimum of 12.5 credit units.

This course is under the general direction of Drs. Weller and Ley, with the collaboration of the staff of the Departments of Microbiology, Tropical Public Health and Epidemiology. The purpose of the course is to provide students in the Master of Public Health program with the basic knowledge of the communicable and infectious diseases, including the relevant ecologic factors which pertain directly to their prevention and control.

Microbiology and Tropical Public Health 1a,b,c is designed for students who have had most of the courses given in the first two years of medical school or their equivalent. The exercises include discussions of the present status of infectious diseases in tropical and temperate climates and the technics available for study of microorganisms and parasites, with special reference to recent methods which have opened a new era in microbiology. The course emphasizes the principal diseases of public health importance. The subjects are presented by etiologic agent, including protozoa, helminths, viruses, rickettsiae, spirochetes and bacteria.

Approximately two-thirds of the time will be devoted to lectures and one-third to conferences, seminar discussions, and laboratory exercises. In the laboratory the student is expected to acquire an understanding of the potentialities as well as the limitations of pertinent public health laboratory procedures.

Tropical Public Health 2a,b. Ecology and Prevention of Tropical Diseases

Seminars, laboratory exercises, assigned reading. *Wednesdays, 1:30-3:30, first and second periods.* Dr. NEVA, Dr. CHERNIN and Dr. FROTHINGHAM.

Credit 2 units.

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This course is designed for students concentrating in the Department of Tropical Public Health. It is planned to supplement Microbiology-Tropical Public Health 1a,b,c, and deals with important disease entities omitted from the basic course because of time limitations. Emphasis is placed on the ecological and epidemiological approach to the multiplicity of interrelated factors governing the welfare of man in tropical and poorly sanitated areas.

Tropical Public Health 3d. Problems in Tropical Health

Lectures and conferences. *Fridays, 10:30-12:30, fourth period.* Dr. WELLER and guest lecturers.

Credit 1 unit.

This course is designed to provide general background information on environmental, social, economic, and political factors influencing the development of health programs in the tropics. At each session a distinguished guest lecturer covers an assigned topic; the subject material includes such diversified topics as the development of professional education in tropical areas, the important problems of agriculture, nutrition, and water supply, and the administrative and political backgrounds in the field of international technical cooperation. Each formal presentation is followed by a period devoted to informal student discussion. Registration is open to all students.

Tropical Public Health 5c,d. Seminar

Seminars and discussions. One hour session twice a month throughout the third and fourth periods. Time to be arranged. Staff of the Department.

Credit .5 unit.

Students particularly interested in tropical health will meet with staff members for the presentation, critical analysis, and discussion of current literature and original investigations. Admission for credit is subject to the approval of the Head of the Department, and the total number of students is limited.

Tropical Public Health 6c. Parasitic Infections of Man

Lectures, laboratory exercises and demonstrations. *Twelve afternoons, Mondays, Wednesdays, and Fridays, 2-5, January and February.* Dr. WELLER, Dr. NEVA, Dr. CHERNIN, Dr. KOCH-WESER, Dr. FROTHINGHAM, Dr. MICHELSON, Dr. PAN and associates.

Credit 1.5 units.

This course is designed primarily for students in the School of Medicine. It is open, however, to a limited number of students registered in the School of Public Health. The important helminth and protozoan parasites of man are considered with reference to their geographic distribution, identification, mode of transmission, pathogenesis, immune reactions, and methods for prevention and control. Clinical aspects and chemotherapy of parasitic diseases

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are discussed. Emphasis is given to methods of laboratory diagnosis. Arthropods of parasitologic importance are briefly surveyed.

Tropical Public Health 7c. Laboratory Technics

Conferences and laboratory. *Tuesdays and Thursdays, 2:30-5:30, third period.* Dr. PAN.

Credit 2 units.

Students are offered the opportunity to learn principles and technics essential for the study of animal parasites of medical and public health importance. The course consists of lectures and laboratory work under tutorial supervision. Emphasis is placed on *in vitro* and *in vivo* cultivation of parasites, their identification, and the investigation of their biological properties. The course is designed to prepare those who will be involved in laboratory research or in field studies in the area of medical parasitology.

Enrollment limited and subject to the approval of the instructor.

Tropical Public Health 8d. Introduction to Molluscs of Public Health Importance

Conferences, laboratory and field exercises. *Tuesdays, 2:30-5:30, fourth period.* Dr. MICHELSON.

Credit 1 unit.

This is an introductory course designed to acquaint the student with the molluscs which may act either as active or passive agents for the dispersal of pathogens, toxins, or parasites which cause disease in man. Special emphasis is given to snails which serve as intermediate hosts of mammalian schistosomes. Students will be offered the opportunity to study field and laboratory technics necessary for an understanding of the taxonomy, morphology, cultivation, ecology and control of these medically important molluscs.

Prerequisite: Consent of instructor.

Tropical Public Health 9d. Introduction to Medical Entomology

Conferences, laboratory, and field exercises. *Thursdays, 2:30-5:30, fourth period.* Dr. SPIELMAN.

Credit 1 unit.

This course deals with the insects, ticks and mites of medical importance. Their recognition, biology, and role in the production of disease are considered. Techniques of identification, collection, rearing and handling will be demonstrated and insect anatomy and physiology briefly reviewed.

Prerequisite: Consent of instructor.

Tropical Public Health 10c. Clinical and Pathologic Features of Tropical Diseases

Case presentations, clinico-pathologic conferences, and demonstrations.

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Saturdays, 9:30-11:30, third period. Dr. NEVA, Dr. VON LICHTENBERG and staff members.

Credit 1 unit.

This course, designed for students particularly interested in tropical medicine, supplements material presented in Microbiology-Tropical Public Health 1a,b,c. The emphasis is on the clinico-pathologic aspects of tropical diseases. At each session one or more disease entities are introduced by presentation of a clinical case, and pertinent clinical and pathological features of the disease then reviewed. Enrollment subject to approval of the instructor.

Prerequisite: Tropical Public Health 6c or equivalent, or enrollment in Microbiology-Tropical Public Health 1a,b,c.

Tropical Public Health 17a,b,c,d,e. Introduction to Laboratory Research

Laboratory exercises. Time and credit to be arranged.

Individual work for candidates at the Master's degree level may be carried out under supervision of a member of the Department. A variety of parasites of medical importance are maintained and are available for studies on metabolism, host-parasite relationships, and chemotherapy. Arrangements are subject to the approval of the instructor.

Tropical Public Health 20. Research

Doctoral candidates or qualified full-time special students may undertake original investigations in the laboratory or in the field by arrangement with the Head of the Department.

Members of the Department are currently engaged in the following areas of research:

(1) Tissue culture and immunological technics as applied to problems in medical virology (Dr. Weller, Dr. Neva, and Dr. Frothingham).

(2) Cultivation *in vitro* of parasitic helminths, protozoa, and other invertebrates of medical importance (Dr. Weller, Dr. Neva, Dr. Chernin, Dr. Frothingham, and Dr. Pan).

(3) Biology, host-parasite relationships, and control of molluscan vectors of schistosomiasis and of other parasitic infections (Dr. Chernin, Dr. Michelson, and Dr. Pan).

(4) Population genetics, nutrition, and reproduction of medically important arthropods (Dr. Spielman).

(5) Arthropod transmission of viral, protozoan, and helminthic agents (Dr. Frothingham, Dr. Pan, and Dr. Spielman).

Microbiology and Tropical Public Health 40c. Tuberculosis

Conferences, seminars and demonstrations. *Wednesdays, 10:30-12:30, third period.* Dr. KOCH-WESER and Miss CAMPBELL.

Credit 1 unit.

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The purpose of this course is to provide an understanding of the ecology and the public health significance of tuberculosis which continues to be a world wide problem of major importance. Various features of tuberculosis are presented, particularly the microbiologic, medical, social, and economic aspects.

Demonstrations of pertinent material will be given by the instructors and invited specialists, and previously assigned literature will be discussed. The course will also consider the significance of diseases often confused with tuberculosis, especially the mycoses.

Microbiology and Tropical Public Health 41d. Medical Mycology

Laboratory, conferences and field exercises. *Two afternoon sessions, three hours each, time to be arranged, fourth period.* Miss CAMPBELL and associates.

Credit 2 units.

This course is designed to provide the student with the principles and technics essential to the study of pathogenic fungi of medical and public health importance. The course consists of conferences, lectures and laboratory and field work under tutorial supervision. Emphasis is placed on the isolation of mycotic agents from cases in humans and sources in nature by in *vitro* and in *vivo* cultivation, and on identification by morphologic, biochemical and histologic characteristics. Procedures for soil baiting, soil sampling, skin and serologic tests, as adjuncts in establishing indirect or presumptive diagnosis and in defining geographic distribution and areas of high endemicity, are integral aspects of the course.

The course is designed to prepare graduates for laboratory research or field studies in the area of medical mycology. Enrollment, subject to the approval of the instructor.

Section IV
Special Programs

INTERNATIONAL PROGRAMS

The School of Public Health, together with other divisions of Harvard University, provides an unusual opportunity for the education of students interested in, or already engaged in careers in international aspects of public health. The international interests of the Faculty of Public Health have increased in recent years to such an extent that a new Assistant Dean for International Programs has been appointed to coordinate and administer these various activities.

The School's programs include studies of particular interest to students whose careers may be centered in the World Health Organization, the Agency for International Development of the U.S. State Department, the Peace Corps, the U.S. Public Health Service, and the Armed Forces. It also provides education for prospective members of foundations, medical missions, and industrial firms with international health interests and for other positions involving administration, teaching and research dealing with international aspects of public health.

The relevant courses are not concentrated in any one department of the School since all departments have world-wide interests in their respective fields. In addition, most of the departments have a long history of international activity, and many have current research projects abroad in which they are directly involved.

Examples of current research being conducted by Harvard School of Public Health Faculty include trachoma research in Saudi Arabia and Lebanon; interrelationships of health and economic development in Tunisia; interrelationships of health planning and economic development in Latin America; child growth and development in Italy; comparative heart disease studies in Ireland and U.S.; nutrition research in Colombia; population studies in Chile, Greece, United Arab Republic and India; typhus in Yugoslavia; research on urinary calculi in Thailand; schistosomiasis in St. Lucia; cooperative

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cardiovascular disease investigation in Japan; relative importance of hereditary and environmental factors in cardiovascular disease in Israel; and collaborative studies on cervical cancer, breast cancer, and leukemia involving numerous countries.

Other divisions of the University such as the Graduate School of Public Administration, the Center for Middle Eastern Studies, the East Asian Research Center, and the Center for International Affairs, provide additional opportunities for study in economics, public administration, and related subjects for students with special interests in particular regions of the world.

International House, the School's residence for its graduate students and their families, both from the United States and abroad, provides an unusual opportunity for international contacts and shared extracurricular activities with professional health workers from a variety of countries. Some 22–28 nations are represented in this group each year.

Finally, the Boston area as a whole provides a stimulating atmosphere for students interested in international affairs through such agencies as the local chapter of the Society for International Development, the World Affairs Council, and many other agencies, programs and activities.

For students interested in obtaining the Master's degree and having a special interest in preparing for careers in international health, the following program of studies is suggested:

- (1) Required courses include Principles of Biostatistics, Epidemiology, Organization and Administration of Health Services I, and Water and Food Sanitation.
- (2) Recommended semi-elective courses (from certain required study areas) include The Human Community, Ecology and Epidemiology of Infectious Diseases, Nutrition and Maternal and Child Health.
- (3) Electives from the course offerings at the Harvard School of Public Health which are relevant to international activities are Organization and Administration of Health Services II, Economics and Administration of Medical Care, Case Study Analysis of Economic and Administrative Problems in Medical Care, Health

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and Illness in Cross-Cultural Perspective, Ecology and Prevention of Tropical Disease, Problems in Tropical Health, Epidemiologic Problems in Infectious Diseases, Introduction to Ecology and Demography, Problems of Rapid Population Growth, and Seminar on Teaching of Preventive Medicine and Public Health.

(4) Other electives may be selected from the courses offered in Cambridge and elsewhere in the University. Such selections might include Economic Development in the Middle East and North Africa, Foreign Aid and the Development Process, Problems of Economic and Political Development, and related courses in government, economics and public administration.

For students who have completed the Master's degree, research programs leading to a doctoral degree may be arranged. These may be carried out locally or overseas in countries where the School has research interests and where adequate faculty supervision of field work is feasible.

Courses of study also are available for advanced health professionals, already possessing the Master of Public Health degree or its equivalent, who are not interested in a doctoral program, but who desire advanced training in specialized areas. The University provides particular opportunities for work in areas such as population dynamics, tropical public health, health economics in developing countries, public administration and in regional studies.

COURSES OF STUDY IN PREPARATION FOR ACADEMIC CAREERS

An analysis of the positions occupied by the alumni of the Harvard School of Public Health has shown that they are engaged in a wide range of activities in public health, engineering and medicine. It is of particular importance to the School, however, that approximately 20 per cent of its graduates have entered careers in education and research. Thus the curriculum must provide students with the basis for effective participation in the academic as well as the administrative aspects of public health. A course of study leading to a doctoral degree is the traditional way to prepare for an academic career. The alternative, for those who have completed their professional educa-

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tion, is to spend enough time as a research fellow to learn the technics of investigation and to acquire thorough knowledge of a particular field. The Harvard School of Public Health encourages both types of activity, and offers many courses designed for advanced students and research fellows.

In pursuing these objectives the Faculty has, from time to time, undertaken new plans of instruction when it is clear that the School has both the opportunity and the ability to meet a need in one of the major areas of public health. The experience gained determines whether the particular undertaking can be incorporated into the general academic activity of the School. An example is the special program for teachers of preventive medicine and public health which was begun in 1956 and which has been integrated with the regular academic activities of the School, as described below.

Preventive Medicine and Public Health. In recognition of the need for well trained teachers of preventive medicine and of public health, the School welcomes students whose field of endeavor is, or is likely to be, in departments of preventive medicine and public health in this country or abroad. Each candidate for an academic career in preventive medicine and public health is encouraged to select either a research fellowship or that particular degree program of the School which is best suited to his individual needs and his own professional background. The regular academic programs of the School are sufficiently flexible to meet the varied needs of individual students seeking preparation for academic careers.

Regardless of their degree status, these students are encouraged to acquire a high level of competence in one of the public health disciplines, this being essential for success in an academic career. Special seminars and short periods of observation at representative institutions are included in the schedules offered by the School. When it is advantageous to a particular student, the School seeks to coordinate his course of study with residency training programs, such as those which may be recommended by the American Board of Preventive Medicine or which may be developed in other countries.

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PROGRAMS RELATED TO MENTAL HEALTH AND MENTAL DISORDER

Problems of mental health and mental disorder are of concern to several departments of the School, particularly Epidemiology, Maternal and Child Health, and Public Health Practice. An inter-departmental course on mental health and community psychiatry is offered in 1965-66 under the direction of Drs. Farnsworth and Baler (see p. 40). By developing opportunities for study and research in several aspects of the broad field of mental health, the School hopes to encourage the enrollment of students or the application of research fellows who are interested in mental health and who are qualified to undertake advanced studies in preparation for careers in teaching, research, and administration. For those who enroll as students, the programs in mental health are arranged within the framework of the various degrees offered by the School (see pages 27-35).

In the Department of Epidemiology, students and research fellows may undertake a program of study and research in the application of epidemiologic methods to mental disorders. The plan of work is arranged on an individual basis in consultation with the head of the Department.

In the Department of Maternal and Child Health, students may participate in the community studies concerned with the significance of mental disorders in pregnancy and childhood.

PROGRAMS OF STUDY IN THE DIVISION OF ENVIRONMENTAL HEALTH SCIENCES AND ENGINEERING

The combination of medical, engineering, and related disciplines in the Division of Environmental Health Sciences and Engineering enables the School to offer programs of instruction in special fields such as occupational medicine, aviation health and safety, radiological health, toxicology, and community air pollution control. The Division includes the Departments of Industrial Hygiene, Sanitary Engineering and Physiology. The University Health Services' Division of Environmental Health and Safety is closely re-

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lated and provides opportunities for practical experience in environmental health activities within the University.

Occupational Medicine

Physicians may enroll in this program through any one of the Masters degrees offered by the School. Qualified students may be accepted for a second year of work toward a doctoral degree in one of the fields of occupational medicine or environmental health. Other students may elect to remain for a second year of formal courses and tutorial study in occupational medicine and public health.

The usual course content of the program is listed under the Master of Industrial Health degree (page 30). Additional courses and course content may be found under the department listings.

Aviation Health and Safety

Students may undertake an academic program in Aviation Health and Safety as candidates for one of the various degrees offered by the School (see pages 27-35). The teaching and research in this area are carried out in the Guggenheim Center for Aerospace Health and Safety.

Weekly seminars given throughout the year are designed to meet the special interests of those concentrating in the field of aviation medicine, not only for representatives of the military services, but also for those who plan to enter the medical or engineering departments of aircraft manufacturing companies and civil airlines.

Industrial Hygiene and Industrial Hygiene Engineering

Graduate students in engineering, chemistry, physics, and biology may be admitted to a two-year program leading to a Master of Science in Hygiene degree in industrial hygiene and industrial hygiene engineering. Students having an acceptable year of graduate work elsewhere may be admitted to the program on a one-year basis.

Radiological or Health Physics and Radiation

Control Programs

Programs in radiological hygiene and radiation control are offered by the School of Public Health to graduate students only. Properly

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qualified students may be admitted to a one- or two-year program depending upon whether they have had an acceptable year of graduate work elsewhere. This program leads to a Master of Science in Hygiene degree. A program of courses in radiological hygiene, atomic and nuclear physics, radiological engineering, industrial hygiene, physiology, toxicology, radiation biology and related subjects is planned on the basis of individual backgrounds and needs.

PROGRAM IN THE ECONOMICS AND ADMINISTRATION OF MEDICAL CARE

This interdisciplinary Program, offered by the Department of Public Health Practice, is part of the Interfaculty Program on Health and Medical Care of the Harvard University Department of Economics and Schools of Public Health, Medicine, Business Administration, and Public Administration. The Program offers training and research experience in the provision of medical care services and stresses the study and analysis of varying patterns of personal health services in the United States and other countries.

Students in the Interfaculty Program include physicians and other health professionals, economists, social scientists, and management analysts. They are from various schools and departments within Harvard University, and are enrolled as master and doctoral degree candidates in their own schools and departments while taking the Program's basic courses. The objective with students enrolled in the School of Public Health is to train them in analysis and decision-making and to give them an appreciation of the application of the administrative and social sciences in the operation of medical care programs. For students from other than the School of Public Health, the Program's objective is to provide an adequate understanding of medical care services to allow for the intelligent application of their own specialities to the medical care scene.

The Program's research studies provide opportunities for exceptional students to undertake doctoral work and to gain substantial research experience.

Section V
General Information

GENERAL INFORMATION

REGISTRATION

Registration in the School of Public Health for the academic year 1965-66 will be held on the following dates:

- | | |
|---------------------------------|---|
| September 13, Monday, 10 a.m. | Opening session and registration for new International Students |
| September 15, Wednesday, 2 p.m. | Opening session and registration for new U.S. Students |
| September 20, Monday, 10 a.m. | Opening session and registration for students enrolled in 1964-65 |

The period between the opening sessions and September 24 will be devoted to conferences with Faculty members, selection of courses of study and orientation lectures. Formal instruction will begin on Monday, September 27. All students are required to attend the opening session and to be present for the registration period.

INTERNATIONAL STUDENTS

Students coming to the United States for the first time will participate in a program of lectures and discussions during the period from Monday, September 13 to Friday, September 24, 1965. The program is planned to acquaint the students with our customs and teaching methods, with library and other facilities available. It will include lectures and seminars, visits to various University departments and to hospitals or public health activities in Boston.

During this period each student who comes from outside the United States will have a conference with the Faculty Advisor for Foreign Students to discuss his particular needs and interests. This Advisor, as well as the staff of the Dean's Office, is available for consultation with students throughout the year.

All students who are not citizens of the United States will be referred during the orientation period to the Harvard International

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Office, Holyoke Center, 75 Mt. Auburn Street, Cambridge, where they will show their passports, and fill out a Student Registration form.

FEES AND EXPENSES

The tuition fee is \$1,520 for all first-year full-time students and for candidates for the degree of Master of Science in Hygiene who are in the second year of a two-year program. The fee includes the Health Service Fee for medical care and insurance for all resident students. Each candidate for a degree must have a minimum of one year of residence at the School at full tuition. Students who are enrolled for less than full time pay tuition at reduced rates, as shown in the following schedule:

First Year

Half-time students \$820 per year

Second Year

Full-time resident doctoral candidates \$820 per year

Half-time resident doctoral candidates 470 per year

Non-resident doctoral candidates 250 per year

Other half-time resident students 820 per year

After the second year

Resident doctoral candidates \$320 per year

Part-time Special students, enrolled for less than half-time

First credit unit of course work per term \$80

Each additional unit per term up to 10 units \$35

Payment of Fees

Bills for tuition and fees will be issued and payable as follows:

Issued Payable

At regis- Within ¼ Tuition
tration 10 days

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Nov. 30	Dec. 15	{ $\frac{1}{4}$ Tuition Board through October 31 Miscellaneous Charges
Jan. 30	Feb. 15	{ $\frac{1}{4}$ Tuition Board through December 31 Miscellaneous Charges
April 30	May 15	{ $\frac{1}{4}$ Tuition Board through March 31 Miscellaneous Charges
June 8*	June 15	{ Board to the end of the year Miscellaneous Charges
June 30	July 15	{ Board to the end of the year Miscellaneous Charges

Students who are candidates for degrees must have paid all dues to the University at least one day before the day upon which the degrees are to be voted. A student who leaves during the year is charged to the end of the tuition period in which he leaves provided before that time he gives the Dean notice in writing of his withdrawal; otherwise he is charged to the end of the tuition period in which such notice is given.

A student who leaves the University for any reason whatever must pay all charges against him immediately upon receipt of a bill from the Comptroller's Office. Every student will be held responsible for the payment of fees until he has notified the Dean of his intention to withdraw from the School.

All term bills will be sent to the student at his local address unless the Comptroller's Office is requested in writing to send them elsewhere.

Any student whose indebtedness to the University remains unpaid on the date fixed for payment is deprived of the privileges of the University. Reinstatement is obtained only by consent of the Dean of the School in which the student is enrolled after payment of all indebtedness and a reinstatement fee of \$10. In addition as a condition of reinstatement such student is required to file with the

* Applies only to candidates for degrees.

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Comptroller a bond in the amount of \$1000 as security for the payment of future term bills.

Field Observation Study Visit

The estimated cost of travel, hotel accommodations, and food for the one-week study period in Puerto Rico (Maternal and Child Health 30e) is \$300. Each student wishing to enroll in the course should assure himself that the necessary funds to cover this expense are available from his fellowship or other sources.

STUDENT HEALTH SERVICE

Under the University Health and Insurance Plan students at the School receive medical care and insurance toward hospital expenses. Medical care is provided through the facilities of the Medical Area Health Service, located in the Peter Bent Brigham Hospital. The hospital insurance extends for a period of twelve months from September 1 and covers hospitalization both in Boston and elsewhere. Research Fellows in training status may enroll in the Student Plan.

Dependents of students may be included in the hospital insurance part of the plan, if the student so elects; the rates are \$40 for wives or husbands and \$34 for one or more children, for twelve months. Students are advised to avail themselves of this option.

Entrance medical examinations are not mandatory, but any student may request a physical examination after enrollment in the School.

Evidence of successful vaccination against smallpox within three years is required for entrance to Harvard University and a certification form for this purpose is sent to each student who is accepted for admission.

Any illness necessitating absence from classes should be reported to the Student Health Service Office by the student, or an attending physician, and to the Registrar's Office at the School.

In order to realize maximum benefit from the opportunities provided by the academic program of the School, students must be in excellent physical and mental health. Prospective students are urged

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to undergo a thorough examination to satisfy themselves of their fitness before making arrangements to enter the School.

HOUSING

The Henry Lee Shattuck International House of the School of Public Health was opened in the fall of 1960 as a residence for its graduate students and their families. The Shattuck International House includes three remodelled apartment houses, at 199, 203 and 207 Park Drive, Boston, within walking distance of the School. There are 63 furnished apartments on four floors, including units with one to four rooms, plus kitchenette, bath and foyer. On the ground floors of the buildings are located the social and recreational rooms for the adult residents, the laundry facilities and a playroom for the children. There is also an equipped outdoor playground for the children of the Shattuck International House. Because of the great demand for the apartments, students are advised to submit their applications as soon as possible after notification of their acceptance to the School. Applications for fall occupancy are reviewed in June and applicants are notified by June 30. All inquiries should be addressed to Mrs. Margaret D. Penrose, Harvard School of Public Health, 55 Shattuck Street, Boston, Mass. 02115.

Other accommodations are available in the vicinity of the School or in nearby residential areas. Information may be obtained from the Harvard University Housing Office, 1737 Cambridge Street, Cambridge, Mass. 02138, or from the Registrar of the Harvard School of Public Health at 55 Shattuck Street. Married students should indicate the size of their family, number of rooms desired and whether they wish furnished or unfurnished quarters.

EMPLOYMENT

Generally it is not advisable for a student to seek employment as a means of financing his training because the course of study at the School is an intensive, full-time program. If the wife of a student has secretarial or technical skills and wishes to obtain temporary

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employment, she may consult the Harvard Medical Center Personnel Office in Building A of the Medical School after getting settled in Boston. Wives of foreign students who wish to work in Boston must indicate this when obtaining their visas for the United States.

FELLOWSHIPS AND TRAINEESHIPS

The fellowships and traineeships described below were available to students for the academic year 1964-65. It is expected that comparable awards will be available for 1966-67.

Applications for fellowships and traineeships should be made to: The Registrar, Harvard School of Public Health, 55 Shattuck Street, Boston, Massachusetts 02115. Applications should be received by April 1, 1966 for awards for the academic year 1966-67. Under exceptional circumstances awards may be considered at other times.

Fellowships and Traineeships Awarded by the School

Fellowships and traineeships are available from grants to the School for students who are candidates for master's or doctor's degrees. They include a monthly stipend plus tuition. Applicants for awards from Public Health Service or Children's Bureau grants must be citizens of the United States or have been lawfully admitted to the United States for permanent residence.

1. Public Health Service General Purpose Traineeship Grant (Title I) for physicians, dentists, veterinarians, nutritionists, medical social workers, health educators and others whose professional skills are required in modern public health practice.

2. Public Health Service Title II traineeships for public health nurses.

3. Traineeships from Public Health Service Training Grants to Departments of the School are available for study at the pre-doctoral or post-doctoral levels in the following fields:

Biostatistics.

Environmental Health (including occupational medicine, radiological health and air pollution).

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Industrial Hygiene.

Physiology (including toxicology).

Epidemiology; for candidates with degree of M.D. or Ph.D. or equivalent.

Microbiology; for candidates with degree of M.D. or Ph.D. who wish to specialize in the field of infectious disease, including rickettsial, viral, bacterial and mycological infections.

Nutrition.

Public Health Service Special Purpose Traineeship Grant for research training in medical care administration and in public health practice. Available for qualified candidates in the health professions and the social sciences at the post-master's or post-doctoral levels.

Tropical Public Health; for training in medical parasitology, in tropical medicine and in tropical public health.

4. Fellowships provided by a grant from the Children's Bureau are available for students who intend to specialize in Maternal and Child Health.

5. Fellowships provided by a training grant from the National Aeronautics and Space Administration are available for students who intend to specialize in aerospace health and safety.

Fellowships Awarded Outside the School

Fellowships are available in Industrial Medicine and Health Physics from the Atomic Energy Commission. Applicants for fellowships in Industrial Medicine (physicians only) should write to: A.E.C. Fellowships in Industrial Medicine, Atomic Energy Project, University of Rochester, School of Medicine and Dentistry, Rochester 20, New York. Applicants for fellowships in Health Physics should write to: Fellowship Office, Oak Ridge Institute of Nuclear Studies, Oak Ridge, Tennessee.

Fellowships and Scholarships Available in other Departments of the University as well as in the School of Public Health

There are a few General University Scholarships and Fellowships which, under the terms of the original gift to the University, may

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be awarded to students in any part of the University, including the School of Public Health. Many of these are for persons from a particular city, state or country, for study of a particular field, or for those with other special qualifications. Applications for these scholarships must be received at the School of Public Health by February 1, 1966. A pamphlet describing these University Scholarships may be obtained from the Secretary of Admissions and Scholarships of the School of Public Health.

STUDENTS 1964-65

DEGREE CANDIDATES AND FULL-TIME SPECIAL STUDENTS

George A. Ademola, M.B.,B.S., D.P.H.	Lagos, Nigeria
Abdul R. A. Al-Awadi, B.Sc., M.B.,CH.B.	Kuwait
Scott I. Allen, A.B., M.D., M.P.H.	Washington, D.C.
Joan M. Altekruise, A.B., M.D.	Cohoes, New York
Darrell E. Anderson, B.CH.E.	Minneapolis, Minnesota
Caroline L. Ayer, S.B.	Bala-Cynwyd, Pennsylvania
Charles C. Azu, S.B., M.D.	Issele-uku, Nigeria
Gretchen M. Berggren, A.B., M.D.	Aurora, Nebraska
Warren L. Berggren, M.D., M.P.H.	Aurora, Nebraska
Joseph D. Brain, A.B., S.M., S.M. IN HYG.	Wayne, New Jersey
Andrew G. Braun, A.B., S.B.	Brookline, Massachusetts
Adolph J. Brink, A.B., M.D.	Elma, New York
Gro H. Brundtland, M.D.	Oslo, Norway
Max J. Bulian, S.B., M.D.	Chestnut Hill, Massachusetts
Charles R. Buncher, S.B., S.M. IN HYG.	Millburn, New Jersey
Edward J. Burger, Jr., B.Sc., M.D.C.M., M.I.H.	Lorain, Ohio
Thomas R. Byrd, S.B., M.D., M.P.H.	Kershaw, South Carolina
John N. Chappel, A.B., M.D.	Coleman, Alberta, Canada
Paul C. Y. Chen, M.B.,B.S.	Kuala, Lumpur, Malaysia
Peter T. Choras, B.Sc., M.D.C.M.	St. Thomas, Ontario, Canada
Joseph A. Cimino, A.B., S.M., M.D., M.I.H.	Valhalla, New York
Edward F. Cole, S.B., M.D.	Orlando, Florida
Roger R. Connelly, S.B., S.M. IN HYG.	Mason City, Iowa
Constance C. Conrad, A.B., M.D.	Jamestown, North Dakota
Justin L. Conrad, A.B., M.D.	Jamestown, North Dakota
Catherine Coolidge, A.B., M.D.	Boston, Massachusetts
Allen L. Cudworth, S.B., S.M.	Framingham, Massachusetts
Fritz Daguillard, M.D.	Cayes, Haiti
David A. Danielson, A.B.	Sharon, Massachusetts
Chesley R. Davies, S.B., M.D.	Fillmore, Utah
Audie W. Davis, Jr., S.B., M.D.	Norman, Oklahoma
Michael A. Davis, S.B., S.M.	Boston, Massachusetts
John R. Davy, A.B., M.D.	Spring Field, Pennsylvania
Stanley V. Dawson, S.B., S.M.	Cambridge, Massachusetts
Heather M. Day, M.B.,CH.B.	West Newton, Massachusetts
Delfin D. deLeon, D.V.M., M.Sc.	Manila, Philippines
Shirley C. DeSimone, A.B., A.M.	Cambridge, Massachusetts

HARVARD UNIVERSITY

John D. Dougherty, A.B., M.D.	Fort Worth, Texas
James E. Drölte, S.B., S.B., D.V.M.	Pretty Prairie, Kansas
Johanna T. Dwyer, S.B., S.M.	Syracuse, New York
Richard E. Easton, A.B., M.D., M.P.H.	Lawrence, Kansas
Frank R. Enloe, S.B., D.V.M.	Waynesville, North Carolina
Manning Feinleib, A.B., M.D., M.P.H.	Brooklyn, New York
Malcolm S. FitzPatrick, S.B., B.E., S.M.	Montpelier, Vermont
William H. Foege, A.B., M.D.	Denver, Colorado
Paul R. Foote, A.B., M.D.	Seneca Falls, New York
Joseph F. Fraumeni, Jr., A.B., M.D.	Washington, D.C.
Donald T. Fredrickson, A.B., M.D.	Syracuse, New York
Gary D. Friedman, S.B., M.D.	Cambridge, Massachusetts
Jacques G. D. Gaudreau, A.B., M.D., L.M.C.C., D.P.H.	Quebec City, Canada
Robert Anson Gay, S.B., A.M., M.D.	Albuquerque, New Mexico
Virginia R. Hannon, A.B., A.M., M.S.W., S.M. IN HYG. (in absentia)	Atlanta, Georgia
Christian M. Hansen, A.B., M.D.	New Hope, Pennsylvania
Norman B. Hasler, A.B., M.D.	Arlington, Massachusetts
Marion E. Highriter, A.B., M.N., M.P.H.	Wilkes-Barre, Pennsylvania
Tomio Hirohata, M.D.	Fukuoka City, Japan
Alice M. Hosack, S.B., A.M., S.M. IN HYG.	Masury, Ohio
Arthur R. Jacobs, A.B., M.D.	Upper Montclair, New Jersey
Lorraine K. Jaffe, A.B.	Hartford, Connecticut
William R. Jobin, S.B., S.M., S.M. IN HYG.	Foxboro, Massachusetts
Wayne A. Johnson, S.B., M.D.	Isanti, Minnesota
Won C. Kay, M.D., DR.MED.SC.	Seoul, Korea
A. Kay Keiser, S.B., M.P.H.	Kulpmont, Pennsylvania
Irving I. Kessler, A.B., A.M., M.D., M.P.H. (in absentia)	Brooklyn, New York
Charles P. Kirkland, S.B., M.D.	Edmond, Oklahoma
Leslie M. Klevay, S.B., M.D., S.M. IN HYG.	Skokie, Illinois
Michael C. Latham, A.B., M.B., B.CH., B.A.O., D.T.M.&H.	Batte, Sussex, England
Alan I. Levenson, A.B., M.D.	Cambridge, Massachusetts
Yuling Li, A.B.	Brookline, Massachusetts
Lionel M. Lieberman, A.B., M.D.	Hampton, Virginia
Robert D. Lynch, A.B.	Dorchester, Massachusetts
Judith A. Mabel, S.B.	Albany, New York
A. Helen Martikainen, A.B., M.P.H., S.D. (hon.)	Laconia, New Hampshire

SCHOOL OF PUBLIC HEALTH

James O. Mason, A.B., M.D., M.P.H. (in absentia)	Decatur, Georgia
Mary Ann McNichol, A.B., A.M.	Danvers, Massachusetts
Louis M. F. Masse, M.D., M.P.H. (in absentia)	Dakar, Senegal, West Africa
John K. Miller, S.B., M.D., M.P.H.	Nashville, Tennessee
Ralph E. Miller, A.B., M.D.	Hanover, New Hampshire
Maureen K. Molloy, A.B., M.D., S.M. IN HYG.	Boston, Massachusetts
Robert W. Morgan, Jr., A.B., A.M.	New York, New York
Robert M. Moroney, A.B., M.S.W.	Drexel Hill, Pennsylvania
Richard H. Morrow, Jr., A.B., M.D.	Waukegan, Illinois
Royce Moser, Jr., A.B., M.D.	Versailles, Missouri
Debhanom Muangman, A.B., M.D.	Bangkok, Thailand
Raymond L. H. Murphy, Jr., S.B., M.D.	Flushing, New York
Charles Neave, A.B., M.D., M.P.H.	New Canaan, Connecticut
Raymond K. Neff, A.B.	New Rochelle, New York
David M. Nitzberg, A.B., M.SC., S.M. IN HYG.	Lexington, Massachusetts
Gerald S. Parker, S.B., S.M.	Brookline, Massachusetts
James C. G. Pearson, S.B.	Dundee, Scotland
John M. Peters, S.B., M.D., M.P.H.	Salt Lake City, Utah
Ann H. Pettigrew, A.B., M.D.	Cambridge, Massachusetts
Earl S. Pollack, S.B., A.M. (in absentia)	Silver Spring, Maryland
Charles G. Rand, A.B., M.D.C.M.	Ottawa, Ontario, Canada
Helen Z. Reinherz, A.B., S.M., S.M. IN HYG.	Malden, Massachusetts
Parker C. Reist, S.B., S.M., S.M. IN HYG.	State College, Pennsylvania
Harvey I. Remmer, A.B., M.D.	Worcester, Massachusetts
A. Gerald Renthal, A.B., M.D.	Woodmere, New York
David W. Rodgin, A.B., A.M., PH.D., M.D.	Washington, D.C.
Thora J. Runyan, S.B.	Moscow, Idaho
William S. Runyan, S.B., S.M.	Moscow, Idaho
Leonard A. Sagan, A.B., M.D.	Mill Valley, California
Larry D. Samuels, A.A., A.B., S.B., M.D., S.M. IN HYG.	New Windsor, Illinois
Anne W. Schaefer, A.B.	Westport, Connecticut
Vern L. Schramm, S.B.	Howard, South Dakota
Patricia S. Scola, A.B., M.D.	Brookline, Massachusetts
Judith E. Shapiro, A.B.	Brooklyn, New York
Alvin J. Simmons, PH.D., S.M. IN HYG. (in absentia)	South Dartmouth, Massachusetts
Jeannette J. Simmons, S.B., M.P.H.	Studio City, California
Lowell W. Smith, S.B., D.D.S.	Canyon, Texas
John J. Speidel, A.B., M.D.	Minneapolis, Minnesota
James H. Steere, A.B., S.B., D.V.M.	Santa Barbara, California

HARVARD UNIVERSITY

Richard A. Tjalma, S.B., D.V.M.	East Lansing, Michigan
Dwight W. Underhill, B.E., S.M. IN HYG.	Washington, D.C.
Stefania Vago, M.D.	Ashkelon, Israel
Michael O. Varner, S.B.	San Luis Obispo, California
Anton F. Vierling, S.B., S.M., S.M. IN HYG.	Westport, Connecticut
Melva V. Vives, B.S.CH.E.	Quezon City, Philippines
James E. C. Walker, A.B., M.D.	Boston, Massachusetts
Donald M. Watkin, A.B., M.D.	Wellesley Hills, Massachusetts
Elizabeth L. Watkins, A.B., M.S.S.A., S.M. IN HYG.	Chevy Chase, Maryland
Edwin L. Wildner, Jr., A.B., M.D.	Newport News, Virginia
Dorothy J. Worth, M.D.	Newton, Massachusetts
Joseph A. Yacavone, A.B., D.M.D.	Rumford, Rhode Island
John D. Yoder, S.B., S.M. IN HYG.	Kenilworth, New Jersey

PART-TIME SPECIAL STUDENTS

George R. Blumenschein, A.B., M.D.	New York, New York
Aparna Chattoraj, I.Sc., M.B.B.S., D.G.O.	Calcutta, India
Lauretta M. deSa, S.B., S.M.	Karachi, Pakistan
Kathleen Hawkins, A.B., M.D.C.M.	Montreal, Quebec, Canada
Oscar Kurren, A.B., M.S.W.	Winchester, Massachusetts
Philip LaTorre, S.B., S.M. IN HYG.	Wakefield, Massachusetts
Stephen M. Wittenberg, A.B., M.D.	Larchmont, New York

DEGREES

On June 11, 1964, the following degrees were conferred:

DOCTOR OF PUBLIC HEALTH

Robert Loring Glass, S.B. (*Harvard Univ.*) 1943, D.M.D. (*Tufts Univ.*) 1946,
M.P.H. (*Harvard Univ.*) 1959.

Thesis: Mortality of New England Dentists, 1921-60

Special Field: Epidemiology

Stephen J. Plank, PH.B. (*Univ. of Chicago*) 1948, A.B. (*Univ. of Calif.*) 1951,
M.D. (*ibid.*) 1955, M.P.H. (*Harvard Univ.*) 1961.

Thesis: The Reduced Fertility of Female Guinea Pigs Injected with
Homologous Sperm in Adjuvant

Special Field: Microbiology

MASTER OF PUBLIC HEALTH

Harry Joseph Ashe, A.B. (*Wesleyan Univ.*) 1956, M.D. (*Tufts Univ.*) 1961.

Ezra Kenneth Aycock, A.B. (*Duke Univ.*) 1950, M.D. (*Medical Coll. of South
Carolina*) 1954.

Lowell Eliezer Bellin, S.B. (*Yale Univ.*) 1948, M.D. (*State Univ. of New York,
Downstate Med. Center*) 1951.

George Fisher Brown, M.D. (*Univ. of Toronto, Canada*) 1961.

Thomas Raymond Byrd, S.B. (*Clemson Coll.*) 1957, M.D. (*Med. Coll. of South
Carolina*) 1961.

Kirby I Campbell, S.B. (*Univ. of California*) 1955, D.V.M. (*ibid.*) 1957.

Robert Earl Carroll, A.B. (*Stanford Univ.*) 1957, M.D. (*Albany Med. Coll.*)
1961.

Julius Stanley Conner, A.B. (*Univ. of Omaha*) 1954, M.D. (*Univ. of Nebraska*)
1957.

Kenneth Edward Cottle, M.D. (*Univ. of Texas, South Western Med. School*)
1956.

Kenneth Walter Curtis, S.B. (*Beloit Coll.*) 1955, M.D. (*Univ. of Illinois*) 1959.

Raphael Joseph DiNapoli, A.B. (*College of the Holy Cross*) 1955, M.D. (*State
Univ. of New York, Downstate Med. Center*) 1959.

Richard Edwin Easton, A.B. (*Univ. of Kansas*) 1958, M.D. (*ibid.*) 1962.

Ruth Frances Grommers, A.B. (*Radcliffe Coll.*) 1952, M.D. (*Harvard Univ.*)
1961.

Kathleen Hawkins, A.B. (*Marianopolis Coll., Canada*) 1957, M.D., C.M. (*McGill
Univ., Canada*) 1961.

Warren Wise Hodge, S.B. (*Univ. of Louisville*) 1955, M.D. (*ibid.*) 1958.

Alfonso Hudson Holguin, A.B. (*Texas Western Coll.*) 1951, M.D. (*Univ. of
Texas*) 1957.

HARVARD UNIVERSITY

- Walter William Kemmerer, s.b. (*Univ. of Houston*) 1953, M.D. (*Baylor Univ.*) 1959.
- William Harold King, A.B. (*North Texas State Univ.*) 1955, M.D. (*Univ. of Texas, South Western Med. School*) 1959.
- Arnold Immanuel Kisch, A.B. (*Columbia Univ.*) 1954, M.D. (*Harvard Univ.*) 1958.
- Donald Neil Logsdon, s.b. (*Wake Forest Coll.*) 1956, M.D. (*Univ. of Florida*) 1960.
- Julio Isidro Maiztegui, s.b. (*National Coll., Argentina*) 1949, M.D. (*Buenos Aires Univ., Argentina*) 1957.
- John Milton Peters, s.b. (*Univ. of Utah*) 1957, M.D. (*ibid.*) 1960.
- Edward Otis Pratt, LRCP&S. (*Royal Coll. of Surgeons, Ireland*) 1954.
- David L. Rabin, A.B. (*Univ. of Arizona*) 1954, M.D. (*Washington Univ.*) 1958.
- Erik Gerhard Rasmussen, D.D.S. (*Copenhagen Univ., Denmark*) 1958.
- Richard James Salina, s.b. (*Univ. of Pittsburgh*) 1949, M.D. (*ibid.*) 1954.
- Hilbert Bryant Savage, M.D. (*Univ. of Tenn.*) 1958.
- Robert Keith Sikes, A.B. (*Emory Univ.*) 1949, D.V.M. (*Auburn Univ.*) 1957.
- Henry Edward Simmons, s.b. (*Univ. of Pittsburgh*) 1951, M.D. (*ibid.*) 1957.
- Robert Gene Smith, s.b. (*Univ. of Okla.*) 1956, M.D. (*Washington Univ., St. Louis*) 1959, LL.B. (*Harvard Univ.*) 1963.
- Barry Anthony Smithurst, M.B.,B.S. (*Univ. of Sydney, Australia*) 1951 M.R.A.C.P. (*Royal Australasian Coll. of Physicians, Australia*) 1957.
- Hope Henneke Snider, A.B. (*Vassar Coll.*) 1957, M.D. (*Harvard Univ.*) 1962.
- David Eugene Weeks, s.b. (*Northwestern Univ.*) 1955, M.D. (*ibid.*) 1958.
- Omar Abdel Munim Zawawi, M.B.,B.CH. (*Univ. of Cairo, Egypt*) 1958.
- Alan Ziskind, A.B. (*Columbia Univ.*) 1953, M.D. (*Boston Univ.*) 1957.

MASTER OF INDUSTRIAL HEALTH

- Joseph Anthony Cimino, A.B. (*Harvard Univ.*) 1956, S.M. (*Fordham Univ.*) 1958, M.D. (*Univ. of Buffalo*) 1962.

MASTER OF SCIENCE IN HYGIENE

(*in the field of Biostatistics*)

- Charles Ralph Buncher, s.b. (*Massachusetts Institute of Technology*) 1960.
- Nadipuram Rajagopalachar Parthasarathy, B.Sc. (*Mysore Univ., India*) 1953, B.Sc. (*ibid.*) 1955, M.Sc. (*ibid.*) 1956.
- Abdur Rashid, B.Sc. (*Chittagong Govt. Coll., Pakistan*) 1952, M.Sc. (*Dacca Univ., Pakistan*) 1956, M.Sc. (*Karachi Univ., Pakistan*) 1961.
- Leo Harold Riley, M.D. (*Boston Univ.*) 1943.

(*in the fields of Biostatistics and of Epidemiology*)

- Roger Ralph Connelly, s.b. (*Iowa State*) 1958.

SCHOOL OF PUBLIC HEALTH

(in the field of Maternal and Child Health)

Maureen Katherine Molloy, A.B. (*Columbia Univ.*) 1953, M.D. (*State Univ. of New York*) 1957.

(in the field of Microbiology)

Ram Pratap Tewari, B.Sc. (*Lucknow Univ., India*) 1956, B.V.Sc.&A.H. (*Agra Univ., India*) 1960, M.V.Sc. (*ibid.*) 1962.

(in the field of Nutrition)

Deborah Hannah Weiss, A.B. (*Antioch Coll.*) 1962.

(in the field of P.H. Practice, Community Mental Health)

Kevin Maurice Allman, M.B., B.Ch. (*Univ. Coll. Dublin, Ireland*) 1955.

Bernard George Gray, A.B. (*Brooklyn Coll.*) 1956, Ph.D. (*Brandeis Univ.*) 1960.

Norris Hansell, A.B. (*Haverford Coll.*) 1953, M.D. (*Univ. of Pennsylvania*) 1958.

Emma Kraidman, A.B. (*Univ. of Chicago*) 1953, S.B. (*Brooklyn Coll.*) 1953, A.M. (*Clark Univ.*) 1955, Ph.D. (*ibid.*) 1958.

Leo Levy, S.B. (*City Coll. of New York*) 1950, A.M. (*ibid.*) 1951, Ph.D. (*Univ. of Washington*) 1958.

Arvid Steen, M.D. (*Oslo Univ., Norway*) 1950.

Captane Peter Thomson, A.B. (*Univ. of California*) 1952, M.D. (*ibid.*) 1955.

(in the field of Tropical Public Health)

William Roger Jobin, S.B. (*Massachusetts Institute of Technology*) 1959, S.M. (*ibid.*) 1961.

Adetokunbo Oluwole Lucas, B.Sc. (*Univ. of Durham, England*) 1953, M.B., B.S. (*ibid.*) 1956.

(in the field of Environmental Health)

Walter Francis Mazzone, A.B. (*San Jose State Coll.*) 1941, S.B. (*Univ. of Southern Calif.*) 1948.

(in the field of Radiological Health)

Anton Ferdinand Vierling, S.B. (*Notre Dame Univ.*) 1961, S.M. (*Univ. of Conn.*) 1963.

(in the field of Industrial Hygiene)

Stanley Leonard Dryden, S.B. (*Calif. State Polytechnic Coll.*) 1962.

Robert Wayne Veit, S.B. (*Calif. State Polytechnic Coll.*) 1962.

HARVARD UNIVERSITY

On March 8, 1965, the following degrees were conferred:

DOCTOR OF PUBLIC HEALTH

Jamal Karam Harfouche, A.B. (*American Univ. of Beirut*) 1937, M.D. (*ibid.*) 1941, S.M. IN HYG. (*Harvard Univ.*) 1959.

Thesis: Growth and Nutrition in Lebanese Infants, Birth — 18 months
Special Fields: Maternal and Child Health and Nutrition

DOCTOR OF SCIENCE IN HYGIENE

A. Helen Martikainen, A.B. (*Bates Coll.*) 1939, M.P.H. (*Yale Univ.*) 1941, S.D. (hon.) (*Bates Coll.*) 1958.

Thesis: A Study of the Role of the Health Education Specialist in the Preparation of Health Workers
Special Field: Public Health Practice

Earl Sherman Pollock, S.B. (*Univ. of Minnesota*) 1947, A.M. (*ibid.*) 1948.

Thesis: Multi-Factorial Analysis of Psychiatric Admission Rates
Special Field: Biostatistics

MASTER OF SCIENCE IN HYGIENE

(*in the field of Radiological Health*)

Theodore Georgiadis, B.Sc. (*Univ. of Athens*) 1957.

FALL TERM—FIRST PERIOD (September 27 to November 20, 1965)

INTERDEPARTMENTAL COURSE		MICROBIOLOGY	
	<i>Credit Units</i>		<i>Credit Units</i>
1a The Human Community **	2.5	1a,b,c Ecology and Epidemiology of Infectious Diseases **	2 (6)
2a,b Biostatistics and Epidemiology ***	.5	15a,b Seminar in Microbiology	1 (2)
ENVIRONMENTAL HEALTH		NUTRITION	
2a,b Radiological Hygiene	2 (4)	1a,b Public Health Nutrition **	1.5 (2.5)
3a,b Occupational Medical Clinics	.5 (1)	PHYSIOLOGY	
5a,b Aviation Health and Safety	1 (2)	1a,b Human Physiology	1.5 (3)
BIOSTATISTICS		PUBLIC HEALTH PRACTICE	
1a,b Principles of Biostatistics *	1.75 (3.5)	1a,b Organization & Admin. of Health Services I *	1 (3)
15a,b Departmental Seminar	1 (2)	3a,b Economics and Administration of Medical Care	1 (2)
DEMOGRAPHY AND HUMAN ECOLOGY		15a,b Departmental Seminar	1 (2)
40a,b Introduction to Ecology and Demography	1 (2)	TROPICAL PUBLIC HEALTH	
EPIDEMIOLOGY		1a,b,c Ecology and Epidemiology of Infectious Diseases **	
1a,b Principles of Epidemiology *	1.5 (2.5)	(see listing under Microbiology)	
15a,b Departmental Seminar	1 (2)	2a,b Ecology and Prevention of Tropical Diseases	1 (2)
INDUSTRIAL HYGIENE			
2a,b Industrial Air Analysis	2 (4)		
MATERNAL AND CHILD HEALTH			
15a,b Departmental Seminar	1 (2)		

Unscheduled courses: Interdept. Course 42a,b; Industrial Hygiene 6a,b; and all 17 courses. (See Department for description)

* Required of M.P.H. candidates ** Semi-elective courses for M.P.H. candidates *** Required of S.M. in Hyg. candidates

† Figures in parentheses are units for entire course, if this runs longer than one period.

8:30	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
9:30	INTERDEPARTMENTAL 1a**	BIOSTAT. 1a,b*	INTERDEPARTMENTAL 1a**	BIOSTAT. 1a,b*	INTERDEPARTMENTAL 1a**	
10:30		EPID. 1a,b*	MICRO.-T.P.H. 1a,b,c**	EPID. 1a,b*		ENV. HEALTH 3a,b
11:30	P.H. PRACTICE 1a,b*	MICRO.- T.P.H. 1a,b,c**	NUTRITION 1a,b**	MICRO.- T.P.H. 1a,b,c**	P.H. PRACTICE 1a,b*	
12:30		PHYS. 1a,b		PHYS. 1a,b	NUTRITION 1a,b**	
1:30						
2:30	ENV. HEALTH 2a,b LECT. & LAB.	IND. HYG. 2a,b LAB.	ENV. HEALTH BIOSTAT. EPID. M.C.H. MICRO. P.H.P. T.P.H. 5a,b 15a,b 15a,b 15a,b 15a,b 15a,b 2a,b	BIOSTAT. 1a,b* LAB.	BIOSTAT. 1a,b* LAB.	
3:30	DEMOG. & H. E. 40a,b	P.H. PRACTICE 3a,b	ENV. HEALTH 2a,b	MICRO.- T.P.H. 1a,b,c** LAB.		
4:30			I.D. 2a,b***			
5:30						

* REQUIRED OF M.P.H.

CANDIDATES

** SEMI-ELECTIVE COURSES

FOR M.P.H. CANDIDATES

*** REQUIRED OF S.M.

HYG. CANDIDATES

FALL TERM — SECOND PERIOD (November 22, 1965 to January 29, 1966)

INTERDEPARTMENTAL COURSE		<i>Credit Units</i>		<i>Credit Units</i>
2a,b	Biostatistics and Epidemiology ***	.5	(1)†	
3b	History and Philosophy of Public Health	1		
ENVIRONMENTAL HEALTH				
1b	Man's Responses to the Physical Environment**	2.5		
2a,b	Radiological Hygiene	2	(4)	
3a,b	Occupational Medical Clinics	.5	(1)	
5a,b	Aviation Health and Safety	1	(2)	
BIOSTATISTICS				
1a,b	Principles of Biostatistics *	1.75	(3.5)	
15a,b	Departmental Seminar	1	(2)	
DEMOGRAPHY AND HUMAN ECOLOGY				
40a,b	Introduction to Ecology and Demography	1	(2)	
42b	Demographic Techniques	1.5		
EPIDEMIOLOGY				
1a,b	Principles of Epidemiology *	1	(2.5)	
3b	Clinical Problems in Infectious Disease	1		
15a,b	Departmental Seminar	1	(2)	
INDUSTRIAL HYGIENE				
2a,b	Industrial Air Analysis	2	(4)	

Unscheduled courses: Interdept. Course 42a,b; Industrial Hygiene 6a,b; and all 17 courses. (See Department for description)
 * Required of M.P.H. candidates ** Semi-elective courses for M.P.H. candidates *** Required of S.M. in Hyg. candidates

† Figures in parentheses are units for entire course, if this runs longer than one period.

MONDAY		TUESDAY		WEDNESDAY	THURSDAY		FRIDAY	SATURDAY	
8:30	ENVIRONMENTAL HEALTH 1b**	BIOSTAT. 1a,b*		ENV. HEALTH 1b**	BIOSTAT. 1a,b*		ENVIRONMENTAL HEALTH 1b**		ENV. HEALTH 3a,b
9:30		EPID. 1a,b*		MICRO.-T.P.H. 1a,b,c,**	EPID. 1a,b*				
10:30			MICRO.- T.P.H. 1a,b,c**	NUTRITION 1a,b**	MICRO.- T.P.H. 1a,b,c,**	PHYS. 1a,b		P.H. PRACTICE 1a,b*	
11:30	P.H. PRACTICE 1a,b*	PHYS. 1a,b	ENV. HEALTH 1b**		PHYS 2b				
12:30									

1:30	2:30	3:30	4:30	5:30
DEMOG. & H.E. 40a,b	ENV. HEALTH 2a,b LECT. & LAB.	IND. HYG. 2a,b LAB.	PHYS. 2b	P. H. P. 7b
DEMOG. & H.E. 42b	P. H. 3a,b	IND. HYG. 2a,b LAB.	EPID. 3b LECT. & CLINIC	BIOSTAT. 1a,b LAB.
DEMOG. & H.E. 42b	P. H. 3a,b	IND. HYG. 2a,b LAB.	PHYS. 2b	P.H. PRACTICE 1a,b*

* REQUIRED OF M.P.H.

** SEMI-ELECTIVE COURSES

FOR M.P.H. CANDIDATES

*** REQUIRED OF S.M.

HYG. CANDIDATES

SPRING TERM — THIRD PERIOD (February 7 to April 2, 1966)

INTERDEPARTMENTAL COURSE		Credit Units	
4c,d	Research Methods in Community Health	2	(4)†
ENVIRONMENTAL HEALTH			
2c,d	Radiation Dosimetry	1.5	(3)
4c,d	Occupational Medical Clinics	.5	(1)
5c,d	Aviation Health and Safety	1	(2)
6c,6d	Human Factors in Occupational Performance and Safety	1	
BIOSTATISTICS			
2c,d	Statistical Methods	2	(4)
15c,d	Departmental Seminar	1	(2)
EPIDEMIOLOGY			
2c,d	Epidemiology of Non-Infectious Disease **	1	(3)
4c,d	Human Heredity	1	(2)
15c,d	Departmental Seminar	1	(2)
INDUSTRIAL HYGIENE			
1c,d	Basic Problems in Occupational Health	3.5	(7)
MATERNAL AND CHILD HEALTH			
1c	Principles of Maternal and Child Health **	2	
2c,d	Problems and Programs in Maternal and Child Health	2	(4)
MICROBIOLOGY			
1a,b,c	Ecology and Epidemiology of Infectious Diseases **	2	(6)
11c	Public Health Lab. Proc.	2	

Unscheduled courses: Interdept. Course 42c,d; Demog. & H.E. 41c,d; Env. Health 2c,d (Lectures), 3c,d, 8c,d, 40c,d; Ind. Hyg. 7c,d, 8c,d; Microb. 12c; T.P.H. 5c,d; and all 17 courses. (See Department for description)

** Semi-selective courses for M.P.H. candidates

† Figures in parentheses are units for entire course, if this runs longer than one period.

SPRING TERM - THIRD PERIOD

February 7, 1966 to April 2, 1966

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
8:30					
9:30	IND. HYG. 1c,d	EPIDEMIOLOGY 2c,d**	IND. HYG. 1c,d	EPIDEMIOLOGY 2c,d**	
10:30		MICRO.-T.P.H. 1a,b,c**		MICRO.-T.P.H. 1a,b,c**	T.P.H. 10c
11:30					
12:30					
1:30					
2:30					
3:30					
4:30					
5:30					

* REQUIRED OF M.P.H.

CANDIDATES

** SEMI-RELEVANT COURSES
FOR M.P.H. CANDIDATES

ENV. HEALTH 2c,d	ENV. HEALTH 4c,d	ENV. HEALTH 5c,d	ENV. HEALTH 6c,d	ENV. HEALTH 7c,d	ENV. HEALTH 8c,d
PHYS. 5c,d	PHYS. 6c,d	PHYS. 7c,d	PHYS. 8c,d	PHYS. 9c,d	PHYS. 10c,d
PHYS. 11c	PHYS. 12c	PHYS. 13c	PHYS. 14c	PHYS. 15c	PHYS. 16c
PHYS. 17c	PHYS. 18c	PHYS. 19c	PHYS. 20c	PHYS. 21c	PHYS. 22c
PHYS. 23c	PHYS. 24c	PHYS. 25c	PHYS. 26c	PHYS. 27c	PHYS. 28c
PHYS. 29c	PHYS. 30c	PHYS. 31c	PHYS. 32c	PHYS. 33c	PHYS. 34c
PHYS. 35c	PHYS. 36c	PHYS. 37c	PHYS. 38c	PHYS. 39c	PHYS. 40c
PHYS. 41c	PHYS. 42c	PHYS. 43c	PHYS. 44c	PHYS. 45c	PHYS. 46c
PHYS. 47c	PHYS. 48c	PHYS. 49c	PHYS. 50c	PHYS. 51c	PHYS. 52c
PHYS. 53c	PHYS. 54c	PHYS. 55c	PHYS. 56c	PHYS. 57c	PHYS. 58c
PHYS. 59c	PHYS. 60c	PHYS. 61c	PHYS. 62c	PHYS. 63c	PHYS. 64c
PHYS. 65c	PHYS. 66c	PHYS. 67c	PHYS. 68c	PHYS. 69c	PHYS. 70c
PHYS. 71c	PHYS. 72c	PHYS. 73c	PHYS. 74c	PHYS. 75c	PHYS. 76c
PHYS. 77c	PHYS. 78c	PHYS. 79c	PHYS. 80c	PHYS. 81c	PHYS. 82c
PHYS. 83c	PHYS. 84c	PHYS. 85c	PHYS. 86c	PHYS. 87c	PHYS. 88c
PHYS. 89c	PHYS. 90c	PHYS. 91c	PHYS. 92c	PHYS. 93c	PHYS. 94c
PHYS. 95c	PHYS. 96c	PHYS. 97c	PHYS. 98c	PHYS. 99c	PHYS. 100c

SPRING TERM — FOURTH PERIOD (April 11 to June 4, 1966)

INTERDEPARTMENTAL COURSE		Credit Units	MICROBIOLOGY	Credit Units
4c,d	Research Methods in Community Health	2	2d 13d 15c,d	1 3 1
43d	Community Psychiatry and Mental Health	1	NUTRITION	(2)
			2c,d 3c,d 40c,d	2 1 1
ENVIRONMENTAL HEALTH				
1d	Principles of Water and Food Sanitation *	2.5		
2c,d	Radiation Dosimetry	1.5	PHYSIOLOGY	(3)
4c,d	Occupational Medical Clinics	.5	3c,d	(1)
5c,d	Aviation Health and Safety	1	5c,d	(2)
6c,6d	Human Factors in Occupational Performance and Safety	1	PUBLIC HEALTH PRACTICE	
			2c,d	2
BIOSTATISTICS				(4)
2c,d	Statistical Methods	2	4c,d	
15c,d	Departmental Seminar	1		
EPIDEMIOLOGY				
2c,d	Epidemiology of Non-Infectious Disease **	2	5c,d	1
4c,d	Human Heredity	1	6d	(2)
5d	Epidemiologic Problems in Infectious Disease	2	8c,d	(3)
15c,d	Departmental Seminar	1	15c,d	(2)
INDUSTRIAL HYGIENE			41c,d	(2)
1c,d	Basic Problems in Occupational Health	3.5	TROPICAL PUBLIC HEALTH	1
			3d	
MATERNAL AND CHILD HEALTH			8d	(7)
2c,d	Problems and Programs in Maternal and Child Health	2	9d	
				(4)

Unscheduled courses: Interdept. Course 42c,d; Demog. & H.E. 41c,d; Env. Health 2c,d (Lectures), 3c,d, 7d, 8c,d, 40c,d; Ind. Hyg. 7c,d, 8c,d; Mat. and Child Health 3d, 40d; Microb. and T.P.H. 41d; Nutrition 5d; Physiology 4d; T.P.H. 5c,d; and all 17 courses. (See Department for description)

* Required of M.P.H. candidates. ** Semi-elective courses for M.P.H. candidates

† Figures in parentheses are units for entire course, if this runs longer than one period.

SPRING TERM — FOURTH PERIOD

April 11, 1966 to June 4, 1966

MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY	
8:30											
9:30	EPIDEMIOLOGY 2c,d**	INTER- DEPT. 4c,d	MICRO. 2d	EPIDEMIOLOGY 2c,d**		INTER- DEPT. 4c,d	ENV. HEALTH 1d*	ENV. HEALTH 6c 6d	M. C. H. 2c,d	NUTR. 2c,d	
10:30											ENV. HEALTH 1d*
11:30	EPID. & MICRO. 5d			EPID. & MICRO. 5d	P.H.P. 41c,d		ENV. HEALTH 1d*	IND. HYG. 1c,d		T. P. H. 3d	
12:30											

1:30																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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* REQUIRED OF M.P.H.
CANDIDATES
** SEMI-ELECTIVE COURSE
FOR M.P.H. CANDIDATES



CALENDAR FOR THE ACADEMIC YEAR 1965-66

- **September 13, Monday, 10 a.m.* Opening session and registration for new International Students
- **September 15, Wednesday, 2 p.m.* Opening session and registration for new U. S. Students

The period between the opening sessions and September 24 will be devoted to individual conferences with faculty members, selection of courses of study and orientation lectures

- **September 20, Monday, 10 a.m.* Opening session and registration for students enrolled in 1964-65

FALL TERM, SEPTEMBER 27, 1965 TO FEBRUARY 5, 1966

- September 27, Monday* First Period Courses Begin
- October 12, Tuesday* Columbus Day: a holiday
- October 15, Friday* Last day for changes in "a" and "a,b" courses of study
- November 11, Thursday* Veterans' Day: a holiday
- November 20, Saturday* First Period ends
- November 22, Monday* Second Period Courses begin
- November 25, Thursday* Thanksgiving Day: a holiday
- December 10, Friday* Last day for changes in "b" courses of study

RECESS FROM SUNDAY, DECEMBER 19, 1965 TO JANUARY 2, 1966

- January 29, Saturday* Second Period Courses end
- January 31, Monday to February 5, Saturday* Directed reading period, supervised special studies or field observations

SPRING TERM, FEBRUARY 7, 1966 TO JUNE 16, 1966

- February 7, Monday* Third Period Courses begin
- February 22, Tuesday* Washington's Birthday: a holiday
- February 25, Friday* Last day for changes in "c" and "c,d" courses of study
- April 2, Saturday* Third Period ends

RECESS FROM SUNDAY, APRIL 3, 1966 TO SUNDAY, APRIL 10, 1966

- April 11, Monday* Fourth Period Courses begin
- April 29, Friday* Last day for changes in "d" courses of study
- May 30, Monday* Memorial Day: a holiday
- June 4, Saturday* Fourth Period ends
- June 16, Thursday* Commencement

**All students are required to attend the opening session and to be present for the registration period*

